



**RETURN BIDS TO:**

**RETOURNER LES SOUMISSIONS À:**

Bid Receiving - PWGSC / Réception des  
soumissions - TPSGC

11 Laurier St. / 11, rue Laurier

Place du Portage, Phase III

Core 0B2 / Noyau 0B2

Gatineau

Québec

K1A 0S5

Bid Fax: (819) 997-9776

**LETTER OF INTEREST**

**LETTRE D'INTÉRÊT**

Comments - Commentaires

**Vendor/Firm Name and Address**

Raison sociale et adresse du  
fournisseur/de l'entrepreneur

**Issuing Office - Bureau de distribution**

Marine Machinery and Services / Machineries et services  
maritimes

11 Laurier St. / 11, rue Laurier

6C2, Place du Portage

Gatineau

Québec

K1A 0S5

<b>Title - Sujet</b> CONTAINERIZED DIVING SYS. CONTAINER	
<b>Solicitation No. - N° de l'invitation</b> W8482-157782/A	<b>Date</b> 2016-07-07
<b>Client Reference No. - N° de référence du client</b> W8482-157782	<b>GETS Ref. No. - N° de réf. de SEAG</b> PW-\$\$ML-044-25901
<b>File No. - N° de dossier</b> 044ml.W8482-157782	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2016-08-31</b>	
<b>Time Zone</b> Fuseau horaire Eastern Daylight Saving Time EDT	
<b>F.O.B. - F.A.B.</b> Specified Herein - Précisé dans les présentes	
<b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input checked="" type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Aussant, Marc	<b>Buyer Id - Id de l'acheteur</b> 044ml
<b>Telephone No. - N° de téléphone</b> (819) 420-2906 ( )	<b>FAX No. - N° de FAX</b> (613) 889-4254
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>  Specified Herein Précisé dans les présentes	

Instructions: See Herein

Instructions: Voir aux présentes

<b>Delivery Required - Livraison exigée</b> See Herein	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> Raison sociale et adresse du fournisseur/de l'entrepreneur	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur ( taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

Solicitation No. - N° de l'invitation  
W8482-157782/A  
Client Ref. No. - N° de réf. du client  
W8482-157782

Amd. No. - N° de la modif.  
File No. - N° du dossier  
044ml. W8483-157782

Buyer ID - Id de l'acheteur  
044ml  
CCC No./N° CCC - FMS No./N° VME

---

Please note that this is not a solicitation. No Contract will result from this Letter of Interest and Pre-Qualification.

## **Letter of Interest (LOI) and Invitation to Qualify (ITQ)**

**For the**

**Removal and Reinstallation of the Containerized Diving Systems (CDS) into new ISO containers**

**And the**

**Sixty (60) month Preventive Maintenance Overhaul Routine (CDSA-60M) of the Fleet Diving Unit (Atlantic) FDU (A) CDS**

**For the**

**Department of National Defence (DND)**

## 1. Purpose

The purpose of this LOI and ITQ is to qualify Suppliers and determine Industry's interest.

The attached Statement of Works (SOWs) at Annex 'A' and 'B' details the requirements for the removal and re-installation of the CDS and the sixty (60) month Preventive Maintenance Overhaul Routine (CDSA-60M) of the Fleet Diving Unit (Atlantic) FDU (A) Containerized Diving Systems (CDS).

The Canadian Department of National Defense (DND) owns two (2) sets of Containerized Diving Systems (CDS) with one (1) set held at Fleet Diving Unit (Atlantic), FDU(A), Shearwater, NS, and one (1) set held at Fleet Diving Unit (Pacific), FDU(P), Esquimalt, BC. Each CDS set consists of two International Standard Organization (ISO) containers for a total of four containers.

The existing ISO containers for the two (2) sets of CDS are no longer certifiable in accordance with ISO Standards for transport either by land, air or sea. In accordance with the requirements of the Annex 'A' of the contract, these containers must be replaced with new ISO Certified containers and their respective CDS removed, inspected, tested and reinstalled in the new containers.

The contractor must carry out the 60 Monthly Preventive Maintenance Overhaul routine (CDSA-60M) of the FDU(A) only in accordance with the related SOW Annex "B" of the Contract while following the requirements of the SOW Annex "A" of the contract.

Each FDU(P) and FDU(A) set consist of two (2) ISO containers, for each coast. A CDS set includes:

- one (1) Recompression Chamber (RCC) container; and
- one (1) Workshop (WKSP) container.

As noted, this combines to give a total of four (4) ISO containers that require replacement and recertification.

The CDS container replacement shall be accomplished either by customization of existing Commercial off the Shelf (COTS) components or by a purpose built new containers. The new containers must be ISO Certified and include Design System Test, Factory Acceptance Test (FAT), Site Acceptance Test (SAT), Integrated Logistics Support (ILS) and documentation noted in this SOW. The CDS technical and performance requirements are an integral part of this SOW. The old containers must be disposed of in accordance with this SOW.

In its planning, the contractor shall take into account that only one (1) CDS set (RCC and WKSP containers) will be shipped at the time, since DND must always maintain one (1) CDS set operational at all times. Following the successful SAT of the first CDS set by Canada, the second CDS set will be ship to the contractor.

## **2. Requested Information, Interested Supplier's Capability and Qualification**

The Suppliers must demonstrate to Canada's satisfaction that they meet the following mandatory evaluation criteria in order to qualify for Phase II of the bidding process that is the Request for Proposal (RFP).

### **(a) Experience**

- i) Suppliers must have built or customized at least one (1) ISO container within the last five (5) years.
- ii) Suppliers must have built or customized and successfully delivered at least one (1) system in similar complexity to the CDS within the last five (5) years. A system in similar complexity must be a system that is either storing, compressing, extending, mixing or distributing gases for human respiratory purposes.

The Suppliers must provide a detailed description and function of the project in a document which clearly outlines and demonstrates the functionalities of the system including without being limited to, a full description of the system and of the components supplied.

The Suppliers must provide the project name, client name, contract value, date of delivery and an objective evidence of the client acceptance.

### **(b) Capability**

The Suppliers must demonstrate to Canada's satisfaction that they have the capability in system design, manufacturing, set to work and testing. The Suppliers must demonstrate that they are certified under The Safety Standard for Pressure Vessels for Human Occupancy (ASME PVHO-1).

### **(c) Removal and Reinstallation of the Containerized Diving Systems (CDS) into new ISO containers**

Suppliers must demonstrate how they will meet the requirements of the attached SOW A, by addressing the following:

- i) CDS and ISO containers design;
- ii) Environmental Testing in accordance with section 5.2 of the SOW;
- iii) Proposed ISO containers and other equipment; and
- iv) Certifications and Re-Certifications of the containers and the CDS.

### **(d) Sixty Month Preventive Maintenance Routine of the CDS located at the FDU (A)**

Suppliers must demonstrate how they will meet the requirements of the attached SOW B, by addressing the following:

- i) Controlled environment to overhaul the involved equipment and component;
- ii) Separation and tracking of involved equipment and components at the CDS dismantling and removal; and
- iii) Coordinated reinstallation of involved equipment and components at the CDS re-assembling and re-installation.

**(e) Quality Assurance**

Suppliers must demonstrate that in the performance of the Work described in the SOW they will comply with the requirements of:

- i) ISO 9001-2008 – Quality Management Systems – Requirements, published by the International Organization for Standardization (ISO) of ISO 10005:2005; and
- ii) It is not the intent to require that the Suppliers are registered to the applicable standard; however, Supplier's quality management system must address each requirement contained in the standard.

**(f) Rough Order of Magnitude (ROM) of the estimated Prices**

The suppliers must provide a Rough Order of Magnitude of the estimated prices in Canadian currency as per Table A below.

**Table A  
ROM Estimated Prices**

Item	Description	Price
<b>Annex A SOW</b>		
1	Design	\$ _____
2	CDS, 1 <sup>st</sup> Ship set, FDU (A)	\$ _____
3	CDS, 2 <sup>nd</sup> Ship set FDU (P)	\$ _____
4	Documentation including ECs and Certifications	\$ _____
5	Testing	\$ _____
<b>Sub-Total</b>		<b>\$ _____</b>
<b>Annex B SOW</b>		
6	CDSA – 60M of the FDU (A)	\$ _____
7	Documentation and Certifications	\$ _____
8	Testing	\$ _____
<b>Sub-Total</b>		<b>\$ _____</b>
<b>Total</b>		<b>\$ _____</b>

Please note that all financial information will remain with PWGSC Contracting Authority and will be treated as confidential information.

**3. Communications**

All communications during this LOI and ITQ period shall be directed to Marc Aussant, Contracting Authority, via email at [marc.aussant@pwgsc.gc.ca](mailto:marc.aussant@pwgsc.gc.ca) to ensure fair and transparent treatment to all Suppliers.

**4. Technical Data Package**

A Technical data Package (TDP) of the project can be made available by requesting it to the Contracting Authority

## 5. Submission of Responses

**Closing Date and time: August 16<sup>th</sup>, 2016 14:00 EDST**

Interested suppliers must submit their written response to:

Public Works and Government Services Canada  
Marine Systems, ML Division  
Place du Portage, Phase III, 6C2 - 49  
11 Laurier Street  
Gatineau, Québec K1A 0S5  
Attention: Marc Aussant  
Email: marc.aussant@pwgsc.gc.ca  
Phone: (819) 420-2906  
Fax: (819) 956-0897

The written response shall be submitted in the quantities specified below:

Volume	Title	Hard Copy Quantity per Item
1	<b>Technical: Capability and Qualification:</b> i) Item 1: Experience; ii) Item 2: Capability; iii) Item 3: Removal and Reinstallation of the Containerized Diving Systems (CDS) into new ISO containers IAW SOW A; iv) Item 4: Sixty Month Preventive Maintenance Routine of the CDS located at the FDU (A) IAW SOW B; and v) Item 5: Quality Assurance.	2
2	<b>Financial:</b> vi) Item 6: Rough Order of Magnitude of the Estimated Prices.	1

## 6. Evaluation of the interested Supplier's responses

It is the sole responsibility of the Suppliers to provide sufficient information to adequately assess its Deliverables. Only Suppliers who provided information to Canada's satisfaction will receive the Bid Package for Phase II (RFP).

Suppliers must comply with the requirements of this LOI - ITQ and meet all mandatory evaluation criteria to be declared responsive.

Following the response of the interested Suppliers, Canada may request clarification and/or demonstration of the proposed systems.

Should an interested Supplier be of the opinion that some issues are not addressed above, that Supplier is encouraged to provide additional information. This information may be used during Phase II (RFP) of the project.

Any and all expenses incurred by a Suppliers in pursuing this opportunity including the provision of information, clarification, presentation to Canada and any visits are at the Supplier's sole risk and expense.

**ANNEX A**

**LETTER OF INTEREST (LOI)**

**STATEMENT OF WORK (SOW)**

**FOR THE**

**REMOVAL AND REINSTALLATION OF THE CONTAINERIZED**

**DIVING SYSTEMS (CDS) INTO NEW ISO CONTAINERS**

**FOR THE**

**DEPARTMENT OF NATIONAL DEFENCE**

	<p><b>NOTICE</b></p> <p>This documentation has been reviewed by the technical authority and does not contain controlled goods. Disclosure notices and handling instructions originally received with the document shall continue to apply.</p>
	<p><b>AVIS</b></p> <p>Cette documentation a été révisée par l'autorité technique et ne contient pas de marchandises contrôlées. Les avis de divulgation et les instructions de manutention reçues originalement doivent continuer de s'appliquer.</p>

**LIST OF EFFECTIVE PAGES**

Insert latest changed pages, dispose of superseded pages In Accordance With (IAW) applicable orders.

**NOTE**

On a changed page, the portion of the text affected by the latest change is indicated by a vertical line in the margin of the page.

Date of issue for original and changed pages are:

Change      July 7 2016

A zero in Change No. column indicates an original page. The Total number of pages in this SOW is \_\_\_ consisting of the following:

<b>Page No.</b>	<b>Change No.</b>
-----------------	-------------------

## Table of Contents

1.	SCOPE.....	7
1.1	PURPOSE.....	7
1.2	BACKGROUND.....	8
1.3	OBJECTIVE OF THE CDS CONTAINER REPLACEMENT.....	13
2.	DOCUMENTS.....	15
2.1	GOVERNMENT DOCUMENTS .....	15
2.2	NON GOVERNMENT DOCUMENTS .....	16
3.	CDS DELIVERY .....	18
3.1	GENERAL .....	18
3.1.1	Project Management Services .....	18
3.1.2	Design Engineering Services .....	18
3.2	DELIVERABLES .....	18
3.2.1	Production Testing .....	19
3.2.2	Set-to-Work (STW) .....	19
3.2.3	CDS Set Documentation .....	19
4.	PROJECT MANAGEMENT .....	20
4.1	ORGANIZATION .....	20
4.1.1	Project Manager .....	20
4.1.2	Contractor’s Point of contact .....	20
4.2	PROJECT MANAGEMENT PLAN .....	20
4.2.1	Work Breakdown Structure (WBS) .....	20
4.2.2	Risk Management Plan .....	20
4.2.3	Configuration Management Plan .....	20
4.2.4	Integrated Logistic (ILS) Plan .....	20
4.2.5	Quality Assurance (QA) Plan .....	20
4.2.6	Set to Work (STW) Plan .....	21
4.2.7	Factory Acceptance Test (FAT) Plan.....	21
4.2.8	Site Acceptance Test (SAT) Plan .....	21
5.	NEW CDS REQUIREMENTS .....	21
5.1	ENGINEERING REVIEWS AND AUDITS .....	21
5.1.1	System Requirement Review (SRR) .....	21
5.1.2	Preliminary Design Review (PDR) .....	22
5.1.3	Critical Design Review (CDR) .....	22
5.1.4	Functional Configuration Audit (FCA) .....	22

5.2	ENVIRONMENTALS .....	22
5.3	CDS GENERAL DESIGN .....	23
5.4	CDS MECHANICAL DESIGN .....	24
5.4.1	Weight and Dimensions .....	26
5.4.2	Containers interior and exterior painting .....	26
5.4.3	Containers interior insulation .....	27
5.4.4	Containers Deck Overlay .....	27
5.4.5	Containers Floor Drains .....	28
5.4.6	Containers Louvers, Lockable Doors and Penetrations .....	28
5.4.7	Containers Fire Detection and Fire Suppression Equipment .....	29
5.4.8	Containers Audio / Visual repeater Fire Alarm warning equipment .....	29
5.5	CDS ELECTRICAL DESIGN .....	30
5.5.1	Electrical Equipment Replacement .....	30
5.5.2	Extension Cables Assemblies .....	31
5.6	REMOVAL AND RE-INSTALLATION OF THE CDS EQUIPMENT .....	31
5.6.1	Workmanship Requirements .....	31
5.6.2	Removal of the RCCs from the existing containers .....	31
5.6.3	Removal of the Diving System from the existing containers .....	31
5.6.4	Disconnection of the RCC from its supporting subsystems .....	32
5.6.5	CDS Preventive Maintenance Overhaul .....	32
5.6.6	Removal and replacement of all soft seals in piping joints and fitting .....	32
5.6.7	Replacement of the Diver Breathing air/gas piping and fittings .....	32
5.6.8	Securing Points .....	32
5.6.9	Acceptable lubricant .....	32
5.6.10	Reinstallation of the Diving system and RCC .....	32
5.6.11	Reconnection of the RCC to its sub-systems .....	32
5.6.12	Removal and reinstallation of the Furnishing, Cabinets, Shelves, drawers and Tee-nuts .....	33
5.7	DISPOSAL OF THE EXISTING CONTAINERS AND UNSALVAGABLE COMPONENTS .....	33
6.	ACCEPTANCE TESTING .....	34
6.1	SET TO WORK (STW) .....	34
6.1.1	Set to Work Procedures .....	34
6.1.2	Set to Work Procedures for Other Equipment .....	34
6.1.3	Air and Gas Samples .....	34
6.2	FACTORY ACCEPTANCE TEST (FAT) .....	35
6.3	SITE ACCEPTANCE TEST (SAT) .....	35
6.4	TEST MANAGEMENT .....	35

6.4.1	Factory Acceptance Test (FAT) Plan .....	35
6.4.2	Factory Acceptance Test (FAT) Procedures.....	35
6.4.3	Factory Acceptance Test (FAT) Reports .....	35
6.4.4	Site Acceptance Test (SAT) .....	35
6.5	CERTIFICATION .....	37
6.5.1	Certification by Customs Seal Conditions (CSC) .....	37
6.5.2	Letter or Certificate of Acceptance .....	37
7.	INTEGRATED LOGISTICS SUPPORT (ILS) .....	37
7.1	GENERAL .....	37
7.2	MAINTENANCE OF THE CDS CONTAINERS .....	37
7.3	SUPPLY SUPPORT .....	37
7.3.1	Provisioning Parts Breakdown .....	37
7.4	DOCUMENTATION .....	38
7.5	TECHNICAL DOCUMENTATION .....	38
7.5.1	Engineering Data Access .....	38
7.5.2	Technical Publications .....	38
7.5.3	Technical Data Package .....	38
7.5.4	Equipment Registration Numbering .....	38
7.5.5	Original Equipment Manufacturer (OEM) .....	38
8.	ACRONYMS AND ABBREVIATIONS .....	39
9	CONTRACT DELIVERABLE REQUIREMENT LIST (CDRL) AND DATA ITEM DESCRIPTION (DID) .....	41
9.1	General .....	41
9.1.1	Document Changes/Updates .....	41
9.1.2	Deliverable Format and Number of Copies .....	41
9.1.3	Abbreviations .....	41
9.2	CDRL .....	42
9.2.1	Project Management CDRL Summary .....	42
9.2.2	Engineering CDRL Summary .....	42
9.2.3	Acceptance Testing CDRL Summary .....	42
9.2.4	Integrated Logistics Support CDRL Summary .....	43

## LIST OF FIGURES

Figure 1: Outside view of the Existing CDS – RCC.....	8
Figure 2: End view of the recompression chamber section of the existing CDS RCC.....	9
Figure 3: Door view of the recompression chamber.....	9
Figure 4: Interior view from the compressor side CDS RCC.....	10
Figure 5: Interior view from the RCC side CDS RCC.....	10
Figure 6: Workshop container.....	11
Figure 7: Workshop interior (Port view) Fire Suppression piping, Lights, Heater.....	11
Figure 8: Workshop interior (Stbd view) Racks, Red and White Lights.....	12
Figure 9: Workshop interior (Haskel Pump and Bulkhead Channels).....	12
Figure 10: Equipment Identification Plate.....	13

## LIST OF TABLES

Table 1: List of Government Documents.....	15
Table 2: List of Non-Government Documents.....	17
Table 3: List of CDS' sets and Extension Cables Assemblies.....	18
Table 4: Drawings.....	19
Table 5: Certifications.....	19
Table 6: Documentation Set .....	19
Table 7: Environmental Requirements.....	23
Table 8: Containers Weights and Dimensions.....	26
Table 9: Factory Acceptance Test Certification Requirements.....	35
Table 10: Site Acceptance Test Certification Requirements.....	36

## 1. SCOPE

### 1.1 PURPOSE

The Canadian Department of National Defense (DND) owns two (2) sets of Containerized Diving Systems (CDS) with one (1) set held at Fleet Diving Unit (Atlantic), FDU(A), Shearwater, NS, and one (1) set held at Fleet Diving Unit (Pacific), FDU(P), Esquimalt, BC. Each CDS set consists of two International Standard Organization (ISO) containers for a total of four containers.

The existing ISO containers for the two (2) sets of CDS are no longer certifiable in accordance with ISO Standards for transport either by land, air or sea. These containers must be replaced with new ISO Certified containers of the same dimension and achieve the same form, fit and function.

The contractor shall strip out all equipment inside the existing CDS containers. Following the equipment overhaul, the contractor shall reinstall the equipment that can be salvaged into the new ISO containers. The equipment that cannot be salvaged shall be replaced with new equipment. For the FDU (A) CDS only, prior to the reinstallation of the CDS equipment and components, the contractor must carry out the 60 Monthly Preventive Maintenance Overhaul routine (CDSA-60M) in accordance with the related SOW Annex ‘B’ of the Contract.

Each FDU(P) and FDU(A) set consist of two (2) ISO containers, for each coast. A CDS set includes:

- one (1) Recompression Chamber (RCC) container; and
- one (1) Workshop (WKSP) container.

As noted, this combines to give a total of four (4) ISO containers that require replacement and recertification.

The CDS container replacement shall be accomplished either by customization of existing Commercial off the Shelf (COTS) components or by a purpose built new containers. The new containers must be ISO Certified and include Design System Test, Factory Acceptance Test (FAT), Site Acceptance Test (SAT), Integrated Logistics Support (ILS) and documentation noted in this SOW. The CDS technical and performance requirements are an integral part of this SOW. The old containers must be disposed of in accordance with this SOW.

In its planning, the contractor shall take into account that only one (1) CDS set (RCC and WKSP containers) will be shipped at the time, since DND must always maintain one (1) CDS set operational at all times. Following the successful SAT of the first CDS set by Canada, the second CDS set will be ship to the contractor.

## 1.2 BACKGROUND

The CDS have been designed to support surface supplied diving, Mine Counter-Measures diving and battle damage repair diving operations (see Figures 1 to 9). The CDS containers may be deployed at sea from Yard Diving Tenders or any Vessel of Opportunity. The CDS may also be operated from a variety of platforms to support inland diving operations. Each CDS containers is intended to be transported by land, air or sea. Each container may be used separately to fulfill a specific function, or together to provide a total diving system. The CDS will be use either at sea or on land, this in all climates in accordance with Table 7, Environmental Requirements.



**Figure 1: Outside view of the Existing CDS – RCC**



**Figure 2: End view** of the recompression chamber section of the Existing CDS RCC



**Figure 3: Door view** of the recompression chamber section of the Existing CDS – RCC



**Figure 4:** Interior view of bulkhead between the compressor and recompression chamber sections of the Existing CDS – RCC. View from the compressor section side



**Figure 5:** Interior view of bulkhead between the compressor and recompression chamber sections of the Existing CDS – RCC. View from the recompression chamber section side.



**Figure 6: Workshop (WKSP) Container**



**Figure 7: Workshop Interior (Port view) Fire Suppression Piping, Lights, and Heater**



**Figure 8: Workshop Interior (STBD view) Racks, Red & White Lights**



**Figure 9: Workshop Interior (Haskel Pump and Bulkhead Channels)**



**Figure 10: Equipment Identification Plate (EIP)**

### 1.3 OBJECTIVE OF THE CDS CONTAINER REPLACEMENT

The objectives of the CDS container replacement are:

- a. To replace the 4 CDS containers with a fully supportable system that provides the same core functionality (i.e. form, fit and function) as the existing CDS containers.
- b. To replace the existing CDS container sets with new CDS container sets (2 RCC and 2 WKSP containers) which must be manufactured to allow the transfer of existing diving support and Fire Suppression equipment from the existing CDS containers to the new containers. To achieve this objective it will be necessary to:
  - (1). Purchase new or Fabricate purpose built containers, reconfigure them and supply two (2) new sets of ISO CDS (i.e. 4 new containers);
  - (2). Strip-out from the old CDS all existing equipment and components to be reinstalled in the new CDS;
  - (3). Inspect the stripped out equipment and components for serviceability and condition;
  - (4). Re-Install retained equipment and components in accordance with the approved reconfiguration;
  - (5). Supply new equipment and components as required (such as plumbing, insulation, electrical wiring and panels) to be installed in the new CDS;

- (6) Update the technical documentation including the drawings;
- (7) Set to Work and test the CDS containers with their respective equipment and components. Both Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) are required;
- (8) Have the containers approved for Transportation under Custom Seal and certified by Convention for Safe Containers (CSC);
- (9) Certify the RCC system by a specialized contractor qualified in accordance with Mandatory Hyperbaric Chamber Maintainer Qualifications; and
- (10) Preventive Maintenance Overhaul routine on FDU (A) CDS in accordance with the SOW Annex ‘B’ of the Contract.

## 2. DOCUMENTS

### 2.1 GOVERNMENT DOCUMENTS

The prescribed versions of the following documents are to form a part of this specification to the extent specified herein. The documents listed below are applicable only as set out in this SOW. The revisions of the documents listed below are those in effect as of the date shown on the title page of this SOW.

**Table 1: List of Government Documents**

Item	Document Number	Title
1.	C-87-010-013/MZ-001	Overhaul Instructions Canadian Forces Recompression Chambers (2007-04-10)
2.	C-87-325-A00/MS-001	Operation and Maintenance Instruction Containerized Diving System Recompression Chamber (2007-04-10)
3.	C-87-325-B00/MS-001	Operation and Maintenance Instruction Containerized Diving System WKSP Container (2007-04-10)
4.		MARLANTHQ Naval Architects Hull and Mechanical surveys dated 2011-01-18 (Notification 4284792)
5.		Email, Mechanical Engineer FMF CS dated 27 Feb 2013
6.		Pictures of USN Portable RCC Hull Penetrators
7.	C-87-010-000/TB-003	Cleaning Method for Small Parts in Diver Support Systems Containing less than 500 PSI (35 bar) (2011-08-01)
8.	C-87-010-000/TB-004	Cleaning Policy for CF Diving and Breathing Gas Systems, Equipment and Parts (2011-07-14)
9.	MIL-STD-1622B (SH) with Change 1	Standard Practice for Cleaning of Shipboard Compressed Air Systems (2006-11-15)
10.		DND Paint Preparation and Treatment Recording Form
11.		1996 Statement of Work for the fabrication of Containerized Diving Systems
12.	D-87-003-000/SG-001	Purity of Diving Air (2014-07-01).
13.	C-87-020-001/NG-001	Special Test Instructions Divers Breathing Air Analysis (2014-09-01)
14.	A-EN-007-000/FP-001	Canadian Environment Assessment Act (CEAA)

Item	Document Number	Title
15.	D-01-100-214/SF-000	Preparation of Provisioning Documentation
16.	C-01-000-102/AG-000	National Defence Index of Documentation System
17.	C-01-100-100/AG-006	Writing, Format, and Production of Technical Publications
18.	D-LM-008-002/SF-001	Specification For Marking For Storage And Shipment
19.	D-01-400-001/SG-000	Engineering Drawing Practices for Class Drawing and Technical Data List
20.	C-03-000-000/NQ-001	Treasury Board hazmat policy & HFX Class G-1 spec (see paras 33,41 & 42)
21.	D-01-400-002/SF-000	Specifications for levels of Engineering Drawings and Associated List
22.	D-01-003-001/SG-000	Standard Requirements for the Engineering Content of Ship Drawing and Associated Lists
23.	MIL-STD-1330D(SH)	Precision Cleaning and Testing of Shipboard Oxygen, Helium, HeO <sub>2</sub> , Nitrogen and Helium Systems (2007-06-28)
24.		FDU (A) 50/50 HeO <sub>2</sub> BIBS Supply Panel 2427-A01 – Operating Manual
25.	D-03-003-005/SF-000	General Electrical Specifications for CF Ships (2012-06-01)
26.	A-LM-505-001/AG-001	Guidance Manual Integrated Logistics Support (1995-05-01)
27.	C-01-100-100/AG/006	Writing, Format and Production of Technical Publications (1996-03-01)
28.	A-LM-158-004/AG-001	Transport Manual Volume 4
29.	A-LM-184-001/JS-001	Special Instructions - Repair and Overhaul Contractors 2010-08-25

## 2.2 NON GOVERNMENT DOCUMENTS

Where standards are referenced in this document, unless specifically directed, the whole standard shall apply. Where applicable, the title will indicate what tailoring is required by the Technical Authority (TA).

If any referenced Military Standard in Table 2 has been superseded by a new revision or it has become obsolete and it has been replaced by a new standard or it has not been replaced, then the Contractor shall use the latest revision or replaced standard or an equivalent standard respectively.

**Table 2: List of Non-Government Documents**

<b>Item</b>	<b>Standard</b>	<b>Title</b>
1.	MIL-HDBK-881C 3 Oct 2011	Department of Defence Handbook Work Breakdown structures for Defence Materials Items
2.	ANSI-649-B, 2011	Configuration Management
3.		Latest Edition available Convention for Safe Container (CSC) Regulations
4.	ISO Organization	Any other latest editions of ISO Container references. ISO 668, ISO 1161, ISO 1496-1, ISO 6346
5.		Latest Edition available of (TIR) “Transports Internationaux Routiers”
6.	MIL-HDBK-138B	Latest Edition available of Department of Defense Handbook. Guide to Container Inspection for Commercial and Military Intermodal Containers
7.	AECTP 200	Allied Environmental Conditions and Test Publications 200 “Environmental Conditions”
8.	MIL-STD-1388 1A	Military Standard Logistic Support Analysis Guidelines and Requirements
9.	MIL-STD-1388 2B	Military Standard DOD Requirements for Logistics Support Analysis Record
10.	MIL-STD-1521B	Technical Reviews and Audits for Systems, Equipment, and Computer Software
11.	MIL-STD-973	Configuration Management
12.	MIL-STD-810G	Environmental Engineering Considerations and Laboratory Tests
13.	US Federal Std 595C	Federal Standard 595 Paint Spec
14.	ASTM E 1925	Specification for Engineering and Design Criteria for Rigid Wall Relocatable Structures

### 3. CDS CONTAINER DELIVERY

#### 3.1 GENERAL

The Contractor shall procure/design, customize, manufacture, integrate, set to work, test and deliver to satisfy the requirements of this SOW.

Shipping - DND will arrange to ship the old CDS containers to the contractor's facilities. The contractor will arrange to deliver the new CDS containers to DND's facilities as noted below (Table 3).

##### 3.1.1 Project Management Services

The Contractor shall provide Project Management services as detailed in section 4.

##### 3.1.2 Design Engineering Services

The design engineering shall be IAW with this SOW.

#### 3.2 DELIVERABLES

The Contractor shall produce and deliver the two (2) CDS' sets with extension cables assemblies IAW Table 3, drawings IAW Table 4, Certification IAW Table 5 and documentation IAW Table 6.

**Table 3: List of CDS' sets and Extension Cables Assemblies**

Component	Qty	Locations and or Comments
CDS East	1	Fleet Diving Unit (Atlantic), Shearwater, NS Shipping address: Commanding Officer FDU (A) Attn: FDU (A) MWD Y Hanger Lower base 176 Marine Drive 12 Wing Shearwater Shearwater NS, B0J 3A0
CDS West	1	Fleet Diving Unit (Pacific), Esquimalt, BC Shipping Address: Commanding Officer FDU (P) Attn: FDU (P) ODT Bldg 10 Wilfret Rd. Victoria BC, V9A 7N2
Extension Cables Assemblies	3	As per Appendix A, Engineering Drawings # 9659865, 9659836 and 9659713 items 21 & 30. Two (2) at Shearwater, NS and One (1) at Esquimalt, BC

**Table 4: Drawings**

Title	Total Qty	Comments
Drawings	2	One (1) set of baseline drawings for the RCC container and One (1) set of baseline drawings for the WKSP container.
	4	One (1) set of as built drawings for each of the container

**Table 5: Certifications**

Title	Total Qty	Comments
Certifications and Re-Certifications	4	One (1) Certification for each container in accordance with the latest Convention for Safe Containers and approved for Transport under Customs Seal Certifications (CSC)
	2	Re-Certification of the two (2) RCC systems by a specialized contractor qualified under Mandatory Requirements for Hyperbaric Chamber Maintainer..

**Table 6: Documentation Set**

Title	Qty	Comments
Documentation	3	As per Section Contract Deliverable Requirements List (CDRL) and Data Item Description (DID)

**3.2.1 Production Testing**

Each deliverable container shall be functionally tested as per SOW.

**3.2.2 Set-to-Work (STW)**

The Contractor shall perform the STW Acceptance Testing as detailed in section 6.1.

**3.2.3 CDS Set Documentation**

The contractor shall deliver the CDS set documentation IAW section 7.5.

## **4. PROJECT MANAGEMENT**

### **4.1 ORGANIZATION**

The Contractor shall have a named Project Manager responsible to carry out the work required for the CDS production program.

#### **4.1.1 Project Manager**

The Contractor's Project Manager shall have the authority to plan, direct, control and make decisions for the Contract.

#### **4.1.2 Contractor's Point of contact**

The Contractor's Project Manager shall be the main point of contact with Canada.

### **4.2 PROJECT MANAGEMENT PLAN**

The Contractor shall prepare and deliver a Project Management Plan (PMP) IAW CDRL Item CDRL-PM-01 and DID-PM-01 to identify how the Contractor intends to fulfill the project management requirements of this SOW.

#### **4.2.1 Work Breakdown Structure (WBS)**

The Contractor shall structure the WBS IAW MIL-HDBK-881C (section 2.2, Table 2 and item 1).

#### **4.2.2 Risk Management Plan**

The Contractor shall produce Risk Management plan that establishes procedures for identification, assessment, management, reporting, tracking, reduction and elimination of risks arising from the performance of work.

#### **4.2.3 Configuration Management Plan**

The Contractor shall structure the configuration Management plan to show all the details of the hardware and electrical components of CDS set, IAW ANSI-649B, 2011 (section 2.2, Table 2, item 2).

#### **4.2.4 Integrated Logistic (ILS) Plan**

The Contractor shall structure the ILS IAW MIL-STD 1388 1A and 2B (Section 2.2, Table 2, Items 8 and 9) and A-LM-505-001/AG-001 (section 2.1, Table 1, item 26).

#### **4.2.5 Quality Assurance (QA) Plan**

In Accordance with CDRL-EN-01 and DID-EN-01, the Contractor must submit for acceptance by the Department of National Defence (DND) a Quality Plan prepared according to the latest issue (at contract date) of ISO 10005:2005 "Quality management systems - Guidelines for quality plans", SACC D5402C. The Quality Plan must describe how the Contractor will conform to the specified quality requirements of the Contract and specify how the required quality activities are to be carried out, including quality assurance of subcontractors. The Contractor must include a traceability matrix from the

elements of the specified quality requirements to the corresponding paragraphs in the Quality Plan.

Upon acceptance of the Quality Plan by DND, the Contractor must implement the Quality Plan. The Contractor must make appropriate amendments to the Quality Plan throughout the term of the contract to reflect current and planned quality activities. Amendments to the Quality Plan must be acceptable to DND.

All work is subject to Government Quality Assurance performed at the Contractor's or subcontractor's facility, and at the installation site, by TA or designate. While developing its Inspection and Test Plan (ITP) for the Critical Design Review Package (CDRL-EN-03 and DID-EN-03), the Contractor must liaise with TA to ensure that all mandatory inspections and tests points required by TA are identified and integrated in its ITP. In addition of hold points for mandatory inspections by TA or designate, the ITP will also have to identify points of advance notice to TA or designate for optional attendance to inspections and tests.

#### **4.2.6 Set to Work (STW) Plan**

The Contractor shall structure a STW plan to show how each CDS container components shall be installed, integrated and tested.

#### **4.2.7 Factory Acceptance Test (FAT) Plan**

The contractor shall structure the FAT plan IAW Table 9, to show how each CDS container shall be tested at the factory. The FAT plan shall be presented to the TA for acceptance.

#### **4.2.8 Site Acceptance Test (SAT) Plan**

During the SAT, the Contractor shall provide a Field Service Representative (FSR) to witness and correct any deficiencies related to its work. The SAT IAW Table 10, will be carried out at DND's facility. DND will conduct the SAT in accordance to Table 10. Following a satisfactory SAT, the Work acceptance will take place.

## **5. NEW CDS CONTAINER REQUIREMENTS**

### **5.1 ENGINEERING REVIEWS AND AUDITS**

The engineering reviews and audits shall be prepared and conducted IAW MIL-STD-1521B, (section 2.2, Table 2 and item 10).

#### **5.1.1 System Requirement Review (SRR)**

The Contractor shall conduct a System Requirements Review (SRR) at the Contractor's Facilities, within six (6) weeks after contract award (CA). The SRR review meeting will cover the CDS systems and the SOW requirements. The SRR data package shall be IAW CDRL item CDRL-EN-01 and DID-EN-01 including:

- a. Acceptances of PDR and CDR process and contain;

- b. STW and Qualification testing;
- c. Certifications;
- d. Documentation; and
- e. New drawings, see section 5.3, item g.

### **5.1.2 Preliminary Design Review (PDR)**

The Contractor shall conduct the Preliminary Design Review (PDR) at the Contractor facilities, fifteen (15) weeks after contract award. The PDR shall only be considered successful based on updates of the PDR documentation package with feedback comments provided during the review meeting and prior to the review meeting. The PDR data package shall be IAW CDRL item CDRL-EN-02 and DID-EN-02.

### **5.1.3 Critical Design Review (CDR)**

The Contractor shall conduct the Critical Design Review (CDR) at the Contractor facilities. The CDR shall only be considered successful based on updates of the CDR documentation package with feedback comments provided during the review meeting and prior to the review meeting. The CDR data package shall be IAW CDRL item CDRL-EN-03 and DID-EN-03.

### **5.1.4 Functional Configuration Audit (FCA)**

The Contractor shall organize a Functional Configuration Audit (FCA) and prepare the configuration audit package prior to the FAT IAW CDRL-EN-05 and DID-EN-05 and MIL STD 97(section 2.2, Table 2 and item 11). 3. The Technical Authority (TA) shall conduct the FCA review against the CDS design documentation.

The “as-built” configuration shall be compared to the documentation contained in the CDS deliverables obtained at the CDR to ensure accuracy and consistency. All discrepancies shall be documented in a “to be named” log and shall be corrected by the Contractor. The Contractor shall issue the “As Built” Configuration Technical Data Package IAW CDRL item CDRL-EN-05 and DID-EN-05 after completion of the functional configuration audit. These documents are essentially an update of the documentation received at the CDR. These documents are to address inconsistencies found in the functional configuration audit and to reflect the as-built configuration.

## **5.2 ENVIRONMENTALS**

The CDS shall meet the following environmental requirements. If any of the proposed COTS equipment does not fully comply with any of the following specifications, then the Contractor shall customize the equipment to meet the requirements.

*All references to Government requirements and standards in the following MIL STD specifications shall be understood as Canadian Government / Organisations, in place of US Government.*

**Table 7: Environmental Requirements**

<b>Item</b>	<b>Environmental Condition</b>	<b>Requirements</b>	<b>Standard (reference) and Comments</b>
1	Storage and Operating Temperatures	All components - 40°C to + 55°C	MIL-STD 810G Table 501.5 Procedure 1 – Storage.
			MIL-STD-810G, method 502.5, Procedure II Duration of this temperature test can be minimum of 2 hours
2	Humidity	30 to 80% condensing (wet bulb) at 38°C	MIL-STD 810G: 507.5 To meet prescribed tests, steady temperature.
3	Salt Fog	a) Relative Humidity 95% b) Temperature 35 deg. C c) Salt concentration 5% d) PH level 6.2 to 7.2	MIL-STD-810G, Method 509.5  Note: This test can be performed on test coupons.
4	Rain	Spray	MIL-STD-810G Method 506.5, procedure II, customize for spray
5	Shock	Shock and Vibration	MIL-STD-810G, Method 516.6, procedure IV (transit drop).
6	Vessel Motion	The equipment shall be capable to operate in the following conditions:  <b>Pitch:</b> +/- 15 deg.  <b>Roll:</b> + 30 deg. Port and Starboard	

### 5.3 CDS CONTAINER GENERAL DESIGN

- a. Simultaneously or prior to the design phase, the Contractor shall remove from the existing containers all components that can be re-installed in the new containers. Prior to PDR, the contractor shall put in place a report that will indicate the parts that can be salvaged and parts that cannot be salvaged. The report shall include a list of parts to be replaced and their related costs. This report shall be

dress-up in consultation with the TA for approval. During the PDR a decision shall be rendered on the procurement of the parts.

- b. Relocation of the CDS RCC containers HP air, power supply and fire suppression external bulkhead penetrations to prevent interference with Maritime Coastal Defense Vessels (MCDV) upper deck beam in accordance with item 5 of Table 1.
- c. The CDS containers shall be fitted with Equipment Identification Plate (EIP) in accordance with Convention for Safe Container (CSC) Regulations and Figure 10.
- d. All existing name plates identifying various Equipment, Components (i.e. electrical panel, piping and valves, air conditioning, oxygen monitor, sound-powered phone etc.) must be reproduced in metal or plastic with a self-adhesive backing, in the same language, colour and format, and installed in the same location on the new CDS container equipment and components. Identification of piping shall be in accordance with Article 2004 of item 1, Table 1. The name plates required for any new Equipment, Components that are not appearing in the existing CDS containers must be identified by the Contractor and approved by the TA prior to their fabrication and installation in the new CDS.
- e. If modifications were to be required to the new certified containers in order to meet the requirements, the contractor shall ensure in its design development that the containers can be re-certified. The re-certification must be done through an Agency member of the International Association of Classification Societies LTD (IACS).
- f. Re-certification of the two (2) RCC containers and two (2) Workshop containers shall be carried out by a specialized contractor as per contract.
- g. The contractor shall review the existing drawings provided in Appendix A. New drawings updates will be required for any alteration made by the contractor on any sub-systems (electrical, mechanical or pneumatic) on either RCC or Workshop containers. All drawings submitted at PDR, CDR and "as built" shall be subject to the approval of the TA.
- h. In its design plan the contractor shall take into account the HVAC, RCC communication system, O2 monitor system, dual (white and red) lighting systems, power outlets and all other systems.

#### **5.4 CDS CONTAINER MECHANICAL DESIGN**

The mechanical design of the new CDS shall be:

- a. Of the same form-fit-function as the existing CDS container set;
- b. Meet the mechanical shock and motion requirements of Table 7 items 5 and 6;

- c. The double doors of the containers will be considered AFT (see figure 1). The full size door(s) on the side of the container will be considered Left Hand (Port side) see figure 6 for the WKSP container and figures 1 and 2 for the RCC container. This is also the orientation when the container is placed on the vessel.

The contractor must add a lockable personnel/escape door independent of the container swing door assemblies in CDS RCC and WKSP containers left hand swing doors. The Contractor must ensure that a Hold Point and a Mandatory Inspection Point are added to its ITP in order to permit DND ISO Container Inspectors or representative to inspect and confirm that the fabrication and installation the independent lockable personnel/escape doors are in accordance with the approved design and installation of the CDR.

- d. The structural design of the new containers must be develop to meet the load constraints of its internal components;
- e. The structural design of the new containers must meet any lifting requirement encountered during transportation (land, air and sea);
- f. The CDS new containers shall be designed and approved in accordance with the latest Convention for Safe Containers and approved for Transport under Customs Seal Certifications reference Table 2, items 3, 4, 5 and 14;
- g. The contractor shall design, engineer and install new approved attachment points in the new CDS ISO container(s) for a secured installation and service of the compressors and High Pressure (HP) air/gas cylinder banks;
- h. The contractor must enhance the securing points of the CDS ISO container(s), breathing air compressors and cylinder banks in the containers providing strong points for the equipment in accordance with Table 1, item 4, Hull and Mechanical Surveys. The securing points shall support dynamic loads from ships motions in a heavy sea in accordance with Table 7 Environmental Requirements. The under deck structure must be welded in place to provide strong points for the equipment securing. Drawings for newly fabricated strong points shall be part of the Contractor's deliverables at PDR and CDR;
- i. The contractor must fabricate new HeO2 cylinder racks to keep these cylinders off the deck in order to allow air circulation in accordance with Table 1, item 4, Hull and Mechanical Surveys. Drawings for newly fabricated HeO2 cylinder racks shall be part of the Contractor's deliverables at PDR and CDR; and
- j. The contractor must install two (2) Stainless Steel hazardous material placard holders on all four container sides of the CDS RCC and CDS WKSP containers. These hazardous material placard holders must not interfere with the container markings and must meet all standards required by CSC and TIR in accordance with items 3 and 5 of Table 2.

The following is a list of existing drawings for other components

ITEM	EXISTING DRAWING NO.	DESCRIPTION
1	9559429	Workshop Container Assembly
2	9559432	MCM Ancillary Storage Shelf Assembly
3	9659870	MCM Ancillary Storage Unit
4	9559439	Shelf, MCM Ancillary Storage Unit
5	9659697	Top, Shelf
6	9659851	Stiffener
7	9559433 (3 sheets)	RCC Hull Assembly
8	9659802	RCC, General Arrangement
9	9659679	Saddle Assembly, CDS RCC ( <b><i>TO BE RETAINED FOR RE-USE</i></b> )
10	9659852	Bracket Mounting, Pressure Vessel, RCC

- k. All existing furnishings, cabinets, shelves, drawers and Tee Nuts” which secure the furnishings to the deck, deck head and bulkheads shall be re-installed in the new containers.

#### 5.4.1 Weight and Dimensions

The CDS weight and dimensions shall be equal or less than those expressed in Table 8. Minor increases in weight of these components if any must be submitted to TA for approval.

**Table 8: Container’s Weights and Dimensions**

Item #	Equipment	Operational Weight	Dimensions Length, Width, Height In meter (ft)
1	CDS RCC Container	10.6 metric tons	6.1 m X 2.4 m x 2.6 m (20 ft. X 8 ft. X 8.5ft.)
2	CDS WKSP Container	7.0 metric tons	6.1 m X 2.4 m x 2.6 m (20 ft. X 8 ft. X 8.5ft.)

#### 5.4.2 Containers interior and exterior painting

- a. The inside and outside of the new containers shall be painted with marine grade coating. The surface preparation must be conducted in accordance with the Society of Protective Coating SSPC-SP10/NACE 2 – Near White Blast Cleaning Standards and provide a surface profile of 50-75 micron. The entire surface must be cleaned to remove all traces of oil or grease in accordance with SSPC-

SP1 solvent cleaning. The following surfaces must be coated in accordance with the paint manufacturer recommendations and instructions using the following International Paint products or DND TA, DNPS 2-4-4 approved equivalence:

- (1) Internal and External surfaces, One (1) coat of Intershield 300;
  - (2) Internal and External surfaces, One (1) coat of Intergard 263;
  - (3). All internal surfaces, two (2) coats of Interlac #665, colour #17925, colour code (US Federal Standard 595C); and
  - (4). All external surfaces, two (2) coats of Interlac 1, colour #26480, (US Federal Standard 595C).
- b. Preparation and Treatment recorded data, in accordance with item 10 of Table 1, must be filled and made available for TA or designate.
  - c. In accordance with the approved ITP, the contractor must contact TA or designate ahead of time to witness the surface preparation and paint processes.
  - d. The contractor must request new exterior Freight containers Coding, Identification and marking Codes for each of the new CDS Containers. The contractor must paint the Freight containers Coding, Identification and marking Codes in the seven (7) locations of each new CDS Containers with their assigned codes in accordance with ISO 6346. In accordance with the approved ITP, the contractor must arrange ahead of time for a DND ISO Container Inspector to inspect the container's Freight containers Coding, Identification and marking Codes to ensure they meet requirements established in reference with item 4 of table 2.

#### **5.4.3 Containers interior insulation**

The new containers shall be insulated by the interior with non-combustible material approved for marine service. The bulkheads and deck head shall be finished with laminate facing material as indicated in the guidance drawings referenced in Appendix A, drawings #9659746 and # 9659747. The lining inside the container must be fitted that it cannot be removed and replaced without leaving obvious traces in accordance with item 5 of table 2, Annex 7, Section 2. Particular attention is to be given to all bulkhead penetrations of the new containers in order to ensure that both bulkhead and insulation sheathing are sealed properly in accordance with applicable rules and regulations.

#### **5.4.4 Containers Deck Overlay**

The new containers decks shall be overlaid with Royal Canadian Navy (RCN) approved Safety flooring material. The contractor must overlay Safety Flooring Altro Transflor Momentum™ brand; model Elan-MOM2002 (2.7mm) on decks in CDS RCC and WKSP containers in accordance with item 4 of table 1, Hull and Mechanical Survey. This Altro Transflor Momentum™ is the only authorized material approved by DND to be used onboard HMC Ships. The safety flooring material must overlap to wall by 10 centimetres using Altrofix adhesive, IAW D-

28-155-000/TB-003, page 7, Section 27. The contractor must ensure the safety flooring material and adhesive are effectively sealed to prevent water ingress during any mode of transport.

#### **5.4.5 Containers Floor Drains**

The contractor must install four (4) Floor Drains near each corner of CDS RCC and WKSP Containers. These floor drains must be provided with a device preventing access to the interior of the container. In accordance with AECTP 200 Section 238, each drain must have a capacity to remove a minimum rate of **280 litres/m<sup>2</sup>/h**. These valve devices must not be removed and replaced from outside the container without leaving visible traces in accordance with item 5 of table 2. Exact location of these floor drains must be approved by the TA. Drains must be located to allow an easy access for cleaning. Engineering drawings of these newly installed floor drains must be provided to DND TA upon completion of the installation.

#### **5.4.6 Containers Louvers, Lockable Doors and Penetrations**

- a. All penetrations and adjustable ventilation louvers must not protrude beyond the surface of the exterior wall of the container, this as per the latest CSC and TIR regulations for commercial shipping in accordance with item 3 of Table 2 Design Type Approval and annex 7 of article 2 of item 5 of Table 2. TIR approved lockable, mechanical, adjustable louvers must be installed. The apertures for ventilation shall be provided with a device preventing access to the interior of the container. These devices must be such that they cannot be removed and replaced from outside the container without leaving visible traces. Waterproofness shall withstand required performance in accordance with ISO 1496-1, Test #13 Weatherproofness;
- b. The contractor must fit the CDS RCC containers HP Air external bulkhead penetration connections to supply the CDS WKSP containers, power supply and fire hose connections to new location. These connections must be altered in accordance with item 5 of Table 1, proposed panel relocations in order to clear these beams as per Hull and Mechanical Survey, Container Penetrations and Ventilation of item 4 of Table 1, HP Air Piping bulkhead penetration in the RCC container, Figures 1, 2 & 3. These panels must be fabricated in such a way as to prevent any HP air connection, fire hose and power supply connections protruding outside of the container. DND proposes to use forty-five degree angle panels as illustrated in picture in item 6 of Table 1. Conventional box type panel must be fitted with shipping protective cover to prevent damage to the HP Air external bulkhead penetration connections, power supply connection and fire hose connections;
- c. The contractor must fabricate weatherproof covers where necessary and where the ventilation aperture devices in Section 5.4.6 above do not meet the regulations specified in item 3 and 14 of Table 2. These weatherproof covers must meet latest ISO Sea Container and TIR regulations in accordance with items 3 and 5 of Table 2. These weatherproof covers must be such that they

cannot be removed and replaced from outside the container without leaving visible traces. Containers must be inspected before further work is conducted at this point to ensure container bulkhead penetration connections, ventilation aperture devices and weatherproof covers meet the latest edition of items 3, 4 and 5 of Table 2 and inspection records must be made available to DND or designate for review; and

- d. The contractor must provide securing points for the weatherproof covers inside their respective containers referred in Section 5.4.6, sub-paragraph a, b and c, while the containers sits in location for extended periods as per Mechanical Concerns for CDS Containers, Reference item 4 of Table 1. Contractor must provide Engineering drawings at PDR and CDR of these newly fabricated weatherproof covers to DND TA upon completion of the work.

#### 5.4.7 Containers Fire Detection and Fire Suppression Equipment

The contractor must remove the existing Securiplex Model 1010 fire detection/suppression components from the existing containers and re-install them into the new ISO containers. The contractor must inspect all components that were removed. Subject to the TA approval, the Contractor shall replace any non-repairable Fire Suppression plumbing and valve components.

The following is a list of applicable FDS and FSS drawings:

ITEM	DRAWING NO.	DESCRIPTION
1	9559431 (2 sheets)	Diving System General Arrangement (MCDV)
2	9559441 (2 sheets)	Plumbing Assembly RCC
3	9659700 (2 sheets)	Plumbing Assembly Workshop
4	9559444	Wiring Schematic Container Deluge System

#### 5.4.8 Containers Audio / Visual repeater Fire Alarm warning equipment

The contractor must provide and install functional weatherproof external audio/visual repeater Fire Alarm warning equipment that can be removed and stowed away when the containers are in transit in accordance with Table 1 Mechanical Concerns for new CDS Containers. The contractor must provide securing arrangement/points to the new external audio/visual repeater warning equipment inside the containers while the containers are in transit in accordance with Mechanical Concerns for CDS Containers, reference item 4 of Table 1 Engineering drawings of this newly fabricated external audio/visual repeater warning equipment and securing arrangements points must be provided to DND TA upon completion of the work. The external devices securing points for the audio/visual repeater must be within the specifications called upon in accordance with items 3, 4 and 5 of Table 2. Exact location of the audio/visual repeater must

be determined in conjunction with TA. Drawings for outside attachment points and inside stowage shall be part of the Contractor's deliverables at PDR and CDR.

## 5.5 CDS CONTAINERS ELECTRICAL DESIGN

The electrical design of the new CDS shall:

1. Meet the shock, and motion requirements of Table 7, items 5, and 6 with all its internal equipment; and
2. Be in accordance with Section 2.1, Table 1 item 25.

### 5.5.1 Electrical Equipment Replacement

The contractor shall install new electrical equipment in all containers. Existing equipment is not to be reused. The contractor shall install the following new electrical equipment without being limited to circuit breakers, load center (distribution panels), electrical lights, switches, receptacles, thermostats and electrical wires based on guidance drawings IAW Appendix A. The new RCC and WKSP containers shall be fitted with two (2) lighting systems, a conventional lighting system and a red lighting system with their individual switches and circuits, this just like the existing containers. All the electrical installation shall comply as per item 25 of Table 1.

When selecting components for the CDS design, preference shall be given to COTS industrial grade components. In the absence of suitable COTS industrial grade components, COTS commercial components shall be selected and customized if required to meet the environmental requirements of Table 7

The following is a list of applicable to Electrical Equipment drawings

ITEM	DRAWING NO.	DESCRIPTION
1	9659698	Cable Assembly, Extension, Power Transfer
2	9659713 (3 sheets)	Installation Assembly Electrical - Workshop
3	9659733	Panel Connector – RCC
4	9659744	Panel Connector – Workshop
5	9659770 (4 sheets)	Installation Assembly, Electrical - RCC
6	9659836 (2 sheets)	System Schematic RCC/Workshop (Colour Coding, AWG#, Connections)
7	9659850 9659862	Load Center, Modified 120/208 VAC, RCC Load Centre Assembly, 120/208 VAC, RCC
8	9659861 9659864	Load Center, Modified 440 VAC, RCC Load Center Assembly, 440 VAC, RCC
9	9659863 9659860	Load Center Assembly, 120/208 VAC, Workshop Load Center, Modified, 120/208 VAC, Workshop

10	9659865	Cable Assembly, Extension, Fire Suppression
----	---------	---

### **5.5.2 Extension Cables Assemblies**

The contractor shall replace the Extension Cable Assemblies as per Deliverables, section 3.2, Table 3.

## **5.6 REMOVAL AND RE-INSTALLATION OF THE CDS EQUIPMENT**

### **5.6.1 Workmanship Requirements**

The contractor shall comply with the General Material and Workmanship Requirements in accordance with Articles 2002, 2003, 2101 to 2104 and 2107 - 2109 of item 1 of Table 1.

#### **a. Work Premises / Site**

The contractor shall conduct all work inside a clean and dry sheltered area. The work premises / site shall provide a level of cleanliness that allows work on diving system of this type. The work premises / site shall be as per facility cleanliness requirement detailed for Controlled Area in accordance with item 23 of Table 1, Chapter 5, Article 5.1. If at any time during the contract, modification (s) to the work premises / site were to be required in order to meet or maintain the requirements stated under the item 23 of Table 1, Chapter 5, Article 5.1, the modification (s) shall be at the contractor's expense.

### **5.6.2 Removal of the RCCs from the existing containers**

The contractor shall remove the RCCs from the existing containers. Once the RCCs has been removed from existing containers, the contractor shall inspect the RCCs and take all necessary colour photographs of the exterior of the RCCs. In order for the TA to conduct its own assessment of the RCCs condition, the Contractor shall forward the photographs to the TA and report any visible defect or corrosion found.

### **5.6.3 Removal of the Diving System from the existing containers**

The contractor shall remove the existing diving systems from the existing CDS containers and reinstall them into the new CDS containers. The diving system consist of the compressors, all cylinders, the RCC and two (2) saddle assemblies (drawing 9659679) and all interconnecting piping / gauges / pressure reducing valves / safety valves / valves and etc. This shall be done with a minimum of disturbance on the existing piping layout. More specifically, in figures 4 and 5 for CDS RCC and figures 7, 8 and 9 for CDS WKSP, the contractor shall remove the piping layout from the bulkhead with a minimum of disturbance. The contractor shall take all necessary measures in order to protect the full system and all of its openings. All work on the diving system must be carried out in accordance with the reference documentation items 1 to 3 inclusively, 7 to 9 inclusively, 12, 13 and 23 of the Table 1.

As stated in section 5.3, sub-section 1, the removal of the existing diving systems shall be done simultaneously or prior to the design phase and the Contractor must provide to the TA a report of parts that can't be salvaged at the PDR.

#### **5.6.4 Disconnection of the RCC from its supporting subsystems**

The contractor must disconnect the RCC from its supporting sub-systems: compressed breathing air supply, compressed breathing oxygen supply, compressed breathing HeO2 supply, container electrical power distribution and chamber exhaust in accordance with Part 7, section 2, paragraphs 3 to 5 of item 2 of Table 1. All plumbing fitting ends shall be kept in an oxygen/air clean state, packaged and identified in accordance with reference to paragraph 5.16 of item 23 of Table 1. The RCC and its supporting sub-systems must be kept in a clean dry sheltered controlled area in accordance with item 23 of Table 1, Chapter 5, Article 5.1, covered with clean tarpaulins while waiting to be transferred into the new containers.

#### **5.6.5 CDS Preventive Maintenance Overhaul**

The contractor must carry out the 60 Monthly Preventive Maintenance Overhaul routine on FDU (A) CDS in accordance with the Annex B of the contract. The FDU (A) CDS includes gas distributions systems fitted in both CDS containers including RCC serial number 066/97.

#### **5.6.6 Removal and replacement of all soft seals in piping joints and fittings**

The contractor must remove and replace all soft seals in piping joints and fitting in accordance with Article 3170 of item 1 of Table 1, when a break into the breathing air/gas systems are required. The contractor must ensure the soft seal replacements are cleaned for Oxygen services in accordance with Article 2109 of item 1 of Table 1.

#### **5.6.7 Replacement of the Diver Breathing air/gas piping and fittings**

The newly changed CDS diver breathing air/gas piping and fittings must be cleaned in accordance with items 7, 8, 9 and 23 of Table 1 prior to re-install into new CDS Containers.

#### **5.6.8 Securing Points**

The inspection of the securing points must be part of the Inspection and Test Plan (ITP).

#### **5.6.9 Acceptable lubricant**

The only acceptable lubricant to be used for the HP Diver Breathing gas systems shall be in accordance with the NATO Stock Number 9150-01-441-9016.

#### **5.6.10 Reinstallation of the Diving system and RCC**

The contractor must re-install Diving system and RCC in the new containers in accordance with Section 7, Part 2, paragraphs 6 to 8 of (section 2.1, Table 1, item 20) and Reference item 2 of Table 1 and Section 7, Part 2 and Part 3 Reference item 3 of Table 1.

### 5.6.11 Reconnection of the RCC to its sub-systems

The contractor must reconnect the chamber to its supporting sub-systems in accordance with Part 7, Section 2, paragraph 7 of (section 2.1, Table 1, item 2).

The following is a list of applicable Diving System drawings

ITEM	DRAWING NO.	DESCRIPTION
1	9659802	RCC General Arrangement
2	9659821 (3 sheets)	Bottle Rack Frame Assembly
3	9659822	Member Bottom Side
4	9659823	Member Bottom
5	9659824	Member Vertical
6	9659825	Support
7	9659826	Cross Member
8	9659827	Cross Member Horizontal
9	9659828	Member, Top
10	9659829	Lift hook
11	9659830	Support
12	9659831	Saddle
13	9559438 (2 sheets)	RCC Pressure Control Piping Schematic
14	9559449	Piping Schematic Workshop Module
15	9559447	Piping Schematic RCC Module

### 5.6.12 Removal and reinstallation of the Furnishing, Cabinets, Shelves, drawers and Tee-nuts

The contractor shall remove the furnishings, empty all cabinets, shelves and drawers, and remove the Tee Nuts” which secure the furnishings to the deck, deck head and bulkheads in accordance with item 3 of Table 1 , Part 7, Section 2, paragraphs 2 and 3.

### 5.7 DISPOSAL OF THE EXISTING CONTAINERS AND UNSALVAGABLE COMPONENTS

The contractor must dispose of the existing CDS containers and any other components in accordance with A-LM-184-001/JS-001 Part 7 and with municipal, provincial and federal environmental regulations. A “Proof of Disposal” must be forwarded to TA for acceptance. Canada shall not be liable for any extra disposal costs except those costs agreed in the contract.

## **6. ACCEPTANCE TESTING**

The purpose of the acceptance tests is to demonstrate that the CDS containers performance and functional requirements have been satisfactorily met.

### **6.1 SET TO WORK (STW)**

#### **6.1.1 Set to Work Procedures**

In preparation for the FAT, the CDS containers shall be Set-to-Work. The Contractor shall provide the TA with a Set to Work procedures that will be in line with the Test Plan and the Test Procedure listed in section 6.4 below. These procedures shall be in line with the methodologies applicable to the various systems installed inside both CDS container sets. These procedures shall be accepted by the TA prior to beginning the work.

The STW shall cover the following:

- a. New Containers;
- b. Electrical systems;
- c. Fire Detection and Fire Suppression System; and
- d. Diving Systems (RCC, HP Air, Compressors, Gas Banks and etc).

As an example and not limited to, all components of the Diving Support Equipment such as the gas plumbing, Recompression Chamber, compressors and air/gas cylinder banks shall be clean and free from grease and oil. Surfaces are to be cleaned with soapy water and wiped dry in accordance with Reference to Item 1 of Table 1, Part 2 in its entirety. Solvents such as halogenated hydrocarbons and petroleum-based solutions are not to be used for general external cleaning.

#### **6.1.2 Set to Work Procedures for Other Equipment**

Set to Work will also include the HVAC, RCC communication system, CO<sub>2</sub>/O<sub>2</sub> Monitor system, lighting systems, power outlets in accordance with FAT in Table 9.

#### **6.1.3 Air and Gas Samples**

The contractor must demonstrate proof of cleanliness of piping.

- a. The TA or his representatives must take Air and Gas samples in accordance with Article 5020 Item 1 of Table 1 and Item 2 of Table 1 Page 7-4-5 paragraph 6 to 8. The Air and Gas sample will be sent for analysis by DND staff. The contractor shall re-clean in accordance with items 7, 8, 9 and 23 of Table 1 any system that does not pass the DND Purity of Compressed Breathing Air and Gases for Divers Standards in accordance with Reference item 12 of Table 1. The contractor shall inform the TA two (2) weeks in advance prior to proceeding with the air sampling. Sampling air cylinders must be ordered two weeks prior to sampling. DND will then order the air sampling bottles. Consideration of

possible delay must be taken into account should breathing air/breathing gas samples fail.

## **6.2 FACTORY ACCEPTANCE TEST (FAT)**

The Contractor shall perform a Factory Acceptance Test on each of the CDS container. The FAT conduct shall be witnessed and accepted by the TA or its delegated representative.

During the FAT all required gas will be supplied by DND. Consumables shall be supplied by the Contractor.

## **6.3 SITE ACCEPTANCE TEST (SAT)**

The SAT will be conducted by DND. The contractor shall provide a Field Service Representative (FSR) for the duration of the SAT. The SAT will be conducted on all CDS containers and on both coasts.

## **6.4 TEST MANAGEMENT**

### **6.4.1 Factory Acceptance Test (FAT) Plan**

The Contractor shall produce and deliver a FAT plan that provides an overall outline of the entire spectrum of test activities of the CDS containers production program, IAW CDRL item CDRL-AT-01 and DID-AT-01.

### **6.4.2 Factory Acceptance Test (FAT) Procedures**

The Contractor shall produce and deliver the CDS containers FAT Procedures. The FAT procedures shall contain all conditions, precautions, adjustments, expected test results, tolerances, and a list of the tools and test equipment required to verify the correct operation of the entire CDS containers. The FAT procedures shall be delivered IAW CDRL item CDRL-AT-02 and DID-AT-02.

### **6.4.3 Factory Acceptance Test (FAT) Reports**

The Contractor shall prepare the CDS containers FAT reports and submit them IAW CDRL Item CDRL-AT-03 and DID-AT-03.

**Table 9: Factory Acceptance Test Certification requirements**

<b><u>FAT Certification</u></b>	<b>S.O.W.</b>
<b>CSC - ISO - TIR:</b> Numerous Penetrations & Adjustable Ventilation Louvres, Weather tight Covers, Escape Doors, Coding & Id Markings, and Certificate of Compliance.	Section 5.4, Section 5.5, Section 5.6 and Section 6.2

Strong Points Eng. Drawings	Section. 5.4.8
New Cylinder Rack Eng. Drawings	Section 5.5. 9
Safety Flooring to prevent water ingress	Section 5.4.4
4 Floor Drains per containers Eng. Drawings	Section 5.4.5
New Waterproof Covers Eng. Drawings	Section 5.4.6
Clean Breathing Air/Gas Piping & Fittings. Results of Air Samples	Section 6.1.3
New External Audio/Visual Repeater Warning Eqpt and Securing Arrangement Points Eng. Drawings	Section 5.4.8
Preparation & Treatment Record Forms for exterior and interior paint	Section 5.4.2
Electrical Components ((Lights White/Red), Switches, Receptacles, Thermostats.)	Section. 5.5.1
Hazardous Material Placards Holders (2) - Locations	Section 5.6.16
Proof of Cleanliness of Piping	Section 5.6.6
CDS RCC System Checks & Tests	Section 6
List of Part No., Technical Data Package (TDP) & Drawings	Section 7.5.3 & Section 9
Hard Copy of Certification Documents for each CDS containers	Section 6.5
Disposal Certificate of Old Container	Section 5.8

#### 6.4.4 Site Acceptance Test (SAT)

Because of the nature and the complexity of the RCC Test, the operation of the RCC will be conducted by DND in accordance with Table 10.

The SAT will be conducted on all CDS containers and on both coasts. The contractor shall provide a Field Service Representative (FSR) for the duration of the SAT. The FSR shall witness the SAT and in a case of a malfunction / defect / breakdown of the CDS, the FSR shall troubleshoot and repair the CDS and all of its sub-systems in order not to delay the SAT. If the FSR was not able to repair the CDS and/or its sub-systems, the FSR shall return until a solution is found.

**Table 10 Site Acceptance Test Certification requirements**

<b>C-87-010-013/MZ-001</b>	<b>SAT Certifications</b>
Article 5010	Leak Test
Article 5030	Chamber Performance Test
Article 5100	Completion Action

<b>C-87-010-013/NY-001</b>	<b>SAT Certifications</b>
PM 120M13	Chamber System Certification as detailed in part 8 of C-87-325-A00/MS-001 & C-87-325-B00/MS-001

## **6.5 CERTIFICATION**

### **6.5.1 Certification by Customs Seal Conditions (CSC)**

A Certification from the Transport of Goods under Customs Seal Conditions (CSC) must be obtained for each container. Following the certification, the contractor shall install a Safety Approval Plate (SAP) on each container. The SAP shall be in accordance with the "The Approved for Transport under Customs Seal and CSC Safety Approval plate" on each container, this in accordance with the Annex 7, Part II of item 5 of Table 2

### **6.5.2 Letter or Certificate of Acceptance**

TA or designate must carry out a final inspection of each container, examine all CDS to ensure the containers meets the latest CSC and TIR regulations and Standards, and must take delivery of certificate of compliance (C of C) at the end of Factory Acceptance Trials.

## **7. INTEGRATED LOGISTICS SUPPORT (ILS)**

### **7.1 GENERAL**

The Contractor shall establish, implement and control an Integrated Logistics Support (ILS) Program for the new CDS containers and update existing Operation and Maintenance Instructions manuals, Table 1 items 2 and 3, IAW MIL-STD 1388 1A and 2B, of (Section 22, Table 2 Items 8 and 9) and A-LM-505-001/AG-001, (Section 2.1, Table 1, Item 26). The Contractor ILS activities shall form an integral part of all CDS container planning, development, design, production, design qualification test, installation, set to work efforts associated with this SOW.

### **7.2 MAINTENANCE OF THE NEW CDS CONTAINERS**

Based on the Military Standard handbook (MIL-HDBK-138B), the contractor shall describe the maintenance methodology to maintain the new CDS containers.

### **7.3 SUPPLY SUPPORT**

#### **7.3.1 Provisioning Parts Breakdown**

The Contractor shall deliver a Provisioning Parts Breakdown for the new containers in electronic format required for Canadian Forces Supply System (CFSS) IAW D-01-100-214/SF-000 (Table 1 item 15), CDRL item CDRL-LOG-01 and current industrial best practice.

## **7.4 DOCUMENTATION**

The Contractor shall produce and provide the following documentation IAW the SOW:

- a. **Update existing Operation and Maintenance Instructions manuals** IAW Table 1 items 2 and 3;
- b. **Maintenance manuals** for new CDS Containers without being limited to the following:
  - (a) Mechanical and Electrical equipment including all wiring;
  - (b) System troubleshooting documentation;
  - (c) Repair instructions;
  - (d) All the mechanical and electrical schematics; and
  - (e) Illustrated Parts Breakdowns (IPB) (as built-in part list).

## **7.5 TECHNICAL DOCUMENTATION**

### **7.5.1 Engineering Data Access**

The Contractor shall provide access to all engineering data during the contract.

### **7.5.2 Technical Publications**

The Contractor shall prepare and deliver in hard copy and electronic format (PDF) the Technical Publications in English, this as per CFTO format C-01-100-100/AG-006 (Section 2.1, Table 1, Item 17).

### **7.5.3 Technical Data Package**

The contractor must provide a list of part numbers and technical/specification data of newly installed components in electronic format. The contractor must update the Technical Data Package and CDS Technical Drawings per CDRL EN-04 and DID EN-04, and provide copies to TA.

### **7.5.4 Equipment Registration Numbering**

DND will provide the Equipment Registration Number (ERN). The Contractor shall use the ERN as a basis for numbering and identifying all documentation for the corresponding piece of equipment. A-LM-505-353/AG-001 of (Section 2.1, Table 1 Item 26) provides guidance on using the ERN.

### **7.5.5 Original Equipment Manufacturer (OEM)**

The Contractor shall make maximum use of existing OEM technical publications. The Contractor shall if required modify with the OEM's authorization the technical publications to reflect Canadian specific equipment, nomenclature, part numbers, modifications, and maintenance procedures using current industrial best practices.

## 8. ACRONYMS AND ABBREVIATIONS

AIL	Action Item List
CA	Contracting Authority
CDRL	Contract Deliverable Requirement List
CDS	Containerized Diving System
CEAA	Canadian Environmental Assessment Act
CFB	Canadian Forces Base
CMP	Configuration Management Plan
COTS	Commercial Off The Shelf
CSC	Convention for Safe Containers
DID	Data Item Description
DND	Department of National Defence
DWG	Drawing
EIP	Equipment Identification Plate
ERN	Equipment Registration Number
FAT	Factory Acceptance Test
FCA	Functional Configuration Audit
FMF	Forces Maintenance Facility
FMFCB	Forces Maintenance Facility Cape Briton
FMFCS	Forces Maintenance Facility Cape Scott
FMF CS NAVARC	Fleet Maintenance Facility Cape Scott, Naval Architects
FPM	Final Project Meeting
FSR	Field Service Representative
HMC Ships	Her Majesty Canadian Ships
HP	High Pressure
IACS	International Association of Classification Societies Ltd.
IAW	In Accordance With
ISO	International Organization for Standardization
LOI	Letter of Interest
MCDV	Maritime Coastal Defence Vessel
MSDS	Material Safety Data Sheet
NDQAR	National Defence Quality Assurance Representative
OEM	Original Equipment manufacturer
PM	Project Manager
PS	Project Schedule
PSPC	Public Service and Procurement Canada
QAR	Quality Assurance Representative
RCC	Recompression Chamber

RCN	Royal Canadian Navy
RFP	Request for Proposal
SAT	Site Acceptance Test
SOIQ	Statement of Interest and Qualification
SOW	Statement Of Work
TA	Technical Authority
TIR	Transport Internationaux Routiers
WBS	Work Breakout Structure
WKSP	Workshop

## 9 CONTRACT DELIVERABLE REQUIREMENT LIST (CDRL) AND DATA ITEM DESCRIPTION (DID)

### 9.1 General

#### 9.1.1 Document Changes/Updates

All the approved documents shall be prepared and updated as required by the CDRL. All changes to updated versions of documents shall be identified as follows:

1. On a change page indicating page numbers, paragraph numbers, date of change and reason for change;
2. Within the hard copy, by use of change bars in the side margins of the printed document; and
3. Within the soft copy, using a method appropriate to the authoring tools that clearly differentiates old content from new or revised content.

Proposed amendments and the list of effective pages shall be forwarded to the TA for approval as described in the CDRL.

#### 9.1.2 Deliverable Format and Number of Copies

The number of documentation copies required for each CDRL is defined within each CDRL.

**NOTE: All soft copies of documentation shall be in the original editable source file format, e.g. Microsoft Word 2003.**

#### 9.1.3 Abbreviations:

The following abbreviations are used in the CDRLs and DIDs.

A	Approval	PCA	Physical Configuration Audit
AT	Acceptance Test	PDR	Preliminary Design Review
CA	Contract Award	R	Review
CDR	Critical Design Review	SRR	System Requirements Review
I	Information only	STW	Set To Work
Month	Calendar month	wd	Working day
wks	Weeks	FTP	File Transfer Protocol

## 9.2 CDRL

### 9.2.1 Project Management CDRL Summary

<b>Project Management CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-PM-01	DID-PM-01	Project Management Plan	A	Project Kick Off and SRR Meeting date - 10 wd	4.2 and 4.4.1
CDRL-PM-02	DID-PM-02	Meeting Agendas	A	Meeting date - 5 wd	4.4.5
CDRL-PM-03	DID-PM-03	Meeting Minutes	A	Meeting date + 5 wd	4.4.7
CDRL-PM-04	DID-PM-04	Project Status Reports	R	5 <sup>th</sup> wd of each month	4.5.1
CDRL-PM-05	N/A	Project Kick Off and SRR Meeting	R	CA +6 wks	4.4.1

### 9.2.2 Engineering CDRL Summary

<b>Engineering CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-EN-01	DID-EN-01	System Requirements Review Data Package	R	SRR-10 wd	5.1.1
CDRL-EN-02	DID-EN-02	Preliminary Design Review Data Package	R	PDR-10 wd	5.1.2
CDRL-EN-03	DID-EN-03	Critical Design Review Data Package	R	CDR-10 wd	5.1.3
CDRL-EN-04	DID-EN-04	New Drawings Packages and Technical Data Packages	A	PDR and CDR-10 wd	5.3.7 and 7.5.3
CDRL-EN-05	DID-EN-05	Functional Configuration Audit	A	FCA-10 wd	5.1.4

### 9.2.3 Acceptance Testing CDRL Summary

<b>Acceptance Testing CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-AT-01	DID-AT-01	Factory Acceptance Test Plan	A	STW-10 wd	4.2.6 and 6.4.1
CDRL-AT-02	DID-AT-02	Factory Acceptance Test Procedures	A	STW Test-10 wd	6.4.2
CDRL-AT-03	DID-AT-03	Factory Acceptance Test Reports	R	Acceptance Test+10 wd	6.4.3

**9.2.4 Integrated Logistics Support CDRL Summary**

<b>Integrated Logistics Support CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-LOG-01	N/A	Provisioning Parts Breakdown	A	CDR-10 wd	7.3.1
CDRL-LOG-02	DID-LOG-02	Materiel Requirement Packages	A	CDR-10 wd	5.4 and 7.6.2

**ANNEX B**

**LETTER OF INTEREST (LOI)**

**STATEMENT OF WORK (SOW)**

**FOR THE**

**60 MONTH PREVENTIVE MAINTENANCE ROUTINE**  
**OF THE**  
**FLEET DIVING UNIT (ATLANTIC) FDU (A)**  
**CONTAINERIZED DIVING SYSTEMS (CDS)**

**FOR THE**

**DEPARTMENT OF NATIONAL DEFENCE**

	<p><b>NOTICE</b></p> <p>This documentation has been reviewed by the technical authority and does not contain controlled goods. Disclosure notices and handling instructions originally received with the document shall continue to apply.</p>
	<p><b>AVIS</b></p> <p>Cette documentation a été révisée par l'autorité technique et ne contient pas de marchandises contrôlées. Les avis de divulgation et les instructions de manutention reçues originalement doivent continuer de s'appliquer.</p>

**LIST OF EFFECTIVE PAGES**

Insert latest changed pages, dispose of superseded pages In Accordance With (IAW) applicable orders.

**NOTE**

On a changed page, the portion of the text affected by the latest change is indicated by a vertical line in the margin of the page.

Date of issue for original and changed pages are:

Change      July 7 2016

A zero in Change No. column indicates an original page. The Total number of pages in this SOW is \_\_\_ consisting of the following:

<b>Page No.</b>	<b>Change No.</b>
-----------------	-------------------

## Table of Contents

1.	SCOPE.....	6
1.1	PURPOSE.....	6
1.2	BACKGROUND.....	6
1.3	OBJECTIVE OF THE CDSA-60M.....	12
1.4	ACRONYMS AND ABBREVIATIONS.....	13
1.5	DRAWINGS FOR THE EXISTING CDS SETS.....	13
2.	DOCUMENTS.....	14
2.1	GOVERNMENT DOCUMENTS.....	14
2.2	NON GOVERNMENT DOCUMENTS.....	15
2.3	ORDER OF PRECEDENCE.....	15
3.	CDSA-60M DELIVERY.....	16
3.1	GENERAL.....	16
3.2	DELIVERABLES.....	16
4.	PROJECT MANAGEMENT.....	17
4.1	ORGANIZATION.....	17
4.1.1	Project Manager.....	17
4.1.2	Contractor's Point of contact.....	17
4.2	PROJECT MANAGEMENT PLAN.....	17
4.2.1	Work Breakdown Structure (WBS) .....	17
4.2.2	Risk Management Plan.....	17
4.2.3	Configuration Management Plan.....	17
4.2.4	Integrated Logistic (ILS) Plan .....	18
4.2.5	Quality Assurance (QA) Plan.....	18
4.2.6	Set to Work (STW) Plan.....	18
4.2.7	Factory Acceptance Test (FAT) Plan.....	18
4.2.8	Site Acceptance Test (SAT).....	18
5.	CDSA-60M REQUIREMENTS.....	22
5.1	WORK PREMISES SITE.....	22
5.2	RECOMPRESSION CHAMBER (RCC).....	22
5.3	GAS DISTRIBUTION SYSTEMS.....	23
5.3.1	HOSES.....	23
5.3.2	GAUGES.....	23
5.3.3	RELIEF VALVES.....	23
5.3.4	VARIOUS VALVES AND PRESSURE REGULATORS .....	24
5.3.5	VARIOUS PIPING .....	24
5.4	FIRE EXTINGUISHING SYSTEM .....	24
5.5	INTERNAL BATTERIES .....	24
5.6	PURIFICATION SYSTEMS .....	24
5.7	GAS CYLINDERS .....	25
5.8	HASKEL BOOSTER PUMP .....	25
5.9	BAUER K150-3EH HIGH PRESSURE AIR COMPRESSOR .....	25
5.10	OTHER INSTRUCTIONS .....	25

5.11	OTHER INSPECTIONS .....	25
6.	ACCEPTANCE TESTING .....	26
6.1	RECORDS FORMS .....	26
6.2	SET TO WORK (STW) .....	26
6.2.1	Set to Work Procedures .....	26
6.3	FACTORY ACCEPTANCE TEST (FAT) .....	27
6.4	SITE ACCEPTANCE TEST (SAT) .....	27
6.5	TEST MANAGEMENT .....	27
6.5.1	Factory Acceptance Test (FAT) Plan .....	27
6.5.2	Factory Acceptance Test (FAT) Procedures .....	27
6.5.3	Factory Acceptance Test (FAT) Reports .....	27
6.5.4	Site Acceptance Test (SAT) .....	28
6.6	CERTIFICATION .....	28
6.6.1	Certification by Customs Seal Conditions (CSC) .....	28
6.6.2	Letter or Certificate of Acceptance .....	28
7.	ACRONYMS AND ABBREVIATIONS .....	29
8	CONTRACT DELIVERABLE REQUIREMENT LIST (CDRL) AND DATA ITEM DESCRIPTION (DID) .....	31
8.1	General .....	31
8.1.1	Document Changes/Updates .....	31
8.1.2	Deliverable Format and Number of Copies .....	31
8.1.3	Abbreviations .....	31
8.2	CDRL .....	32
8.2.1	Project Management CDRL Summary .....	32
8.2.2	Engineering CDRL Summary .....	32
8.2.3	Acceptance Testing CDRL Summary .....	32

#### LIST OF TABLES

Table 1: List of Government Documents.....	14
Table 2: List of Non-Government Documents.....	15
Table 3: List of CDSA's Equipment and components to be 60M inspected /overhauled/tested/re-certified.....	16
Table 4: Documentation Set.....	17
Table 5: Equipment and components subject Factory Acceptance Test Certification.....	28

## **1. SCOPE**

### **1.1 PURPOSE**

The Canadian Department of National Defense (DND) owns two (2) sets of Containerized Diving Systems (CDS) with one (1) set held at Fleet Diving Unit (Atlantic), FDU(A), Shearwater, NS, and one (1) set held at Fleet Diving Unit (Pacific), FDU(P), Esquimalt, BC. Each CDS set consists of two International Standard Organization (ISO) containers for a total of four containers.

The existing ISO containers for the two (2) sets of CDS are no longer certifiable in accordance with ISO Standards for transport either by land, air or sea. In accordance with the Annex "A" of the Contract, these containers will be replaced with new ISO Certified containers and their respective containerized diving systems (CDS) will be striped out, inspected, reinstalled and tested in the new containers.

While achieving the requirements of the Statement of Work (SOW) Annex "A" of the Contract, the Contractor will have to carry out the Sixty (60) Month Preventive Maintenance Overhaul routine (CDSA-60M) on the CDS of the FDU (A) only, in accordance with this SOW Annex "B" to the Contract.

### **1.2 BACKGROUND**

The Containerized Diving System is comprised of two sections: one International Organization for Standardization (ISO) 20 Container; housing a recompression chamber (RCC), two electric driven BAUER K150-3EH High Pressure Air Compressors, three 6 pack gas storage cylinders (racked) and two mixed gas cylinders (racked), and a second ISO 20 Container comprised of a Workshop with two 6 pack gas cylinders (racked) and a Haskel gas boost pump. Both sub-systems have dedicated gas distribution systems which come with piping, regulators, hoses, instruments and valves.



**Figure 1: CDS RCC – Air banks**



Figure 2: CDS RCC – Compressor 1



**Figure 3: CDS RCC – Compressor 2**



**Figure 4: CDS Workshop Haskel Pump**

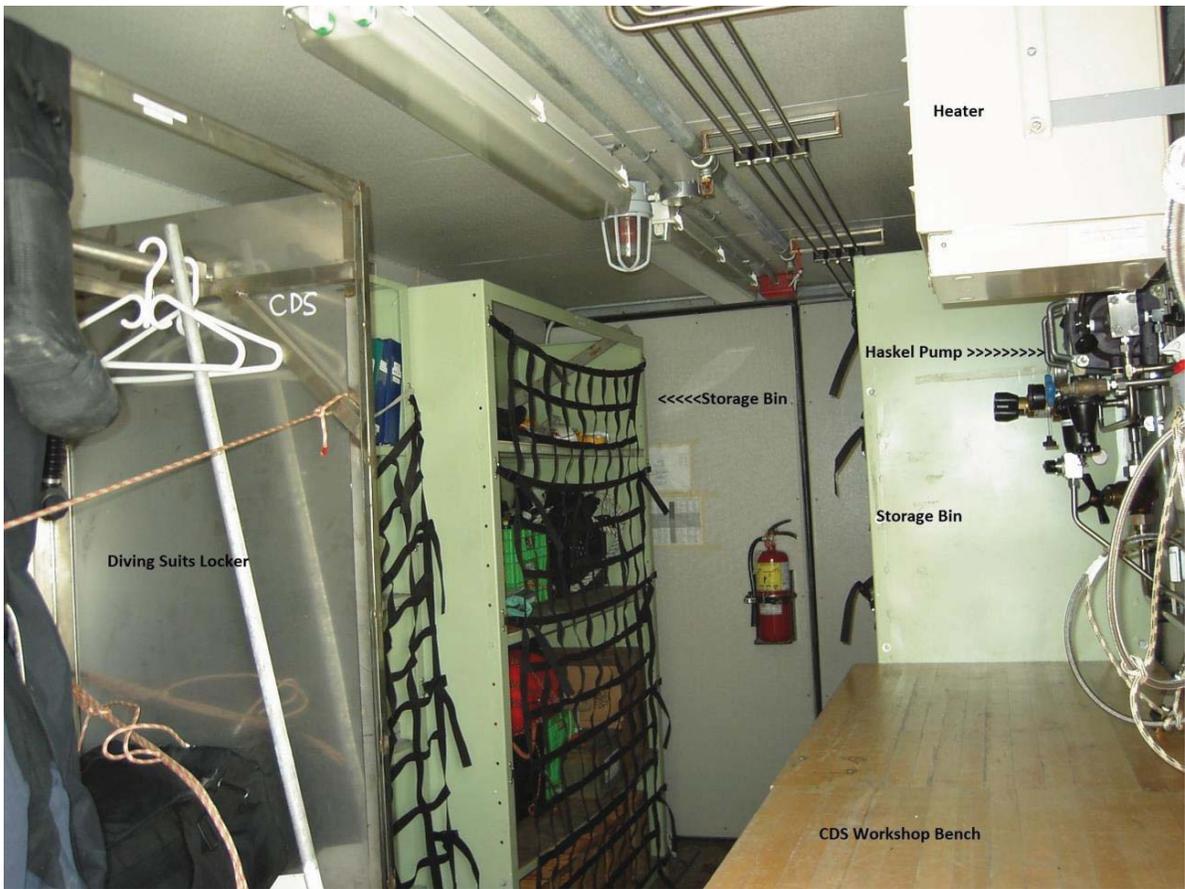


Figure 5: CDS Workshop Storage



**Figure 6: CDS RCC Compartment view**

### **1.3 OBJECTIVE OF THE CDSA-60M**

The objectives of the CDSA-60M are:

- 1.3.1 To re-certify the Containerized Diving System (Atlantic) (CDSA) for sixty (60) months. This re-certification objective will encompass the following;
  - a. The sixty monthly (60M) preventive maintenance on the Recompression Chamber serial number 066/97, in accordance with Ref Table 1 Item 1 and Part 7 Section 2 and 3 of Table 1 Item 2;
  - b. The sixty monthly (60M) preventive maintenance on the Workshop applicable components, in accordance with Ref Table 1 Item 3;
  - c. The Sixty monthly (60M) preventive maintenance on all gas cylinders in accordance with Part 5 Section 5 of Ref Table 1 Item 2 and Transport Canada (TC) or Department of Transport (DOT USA) standards.
  - d. The one thousand (1000) running hour preventive maintenance on the two BAUER K150-3EH High Pressure Air Compressors in accordance with Ref Table 1 Item 5;

- e. The inspection of Recompression Chamber hull welding in accordance with Ref Table 1 item 1, Part 3, Art 3010;
  - f. The replenishment of Consumables in accordance with Part 5 Section 3 of Table 1 Items 2 and 3;
  - g. Inspections of applicable CDSA components in accordance with Part 5 Section 4 of Refs Table 1 Items 2 and 3;
  - h. All required tests of applicable CDSA components in accordance with Part 8 of Refs Table 1 Items 2 and 3; and
  - i. Removal and overhaul of the Haskel gas booster pump in accordance with Table 1 Item 7;
- 1.3.2 Ensure that the above certifications are obtained through a specialized contractor qualified in accordance with Mandatory Hyperbaric Chamber Maintainer Qualifications; and
- 1.3.3 Coordinate the work required to obtain the above certifications with the transfer of the CDS in the new ISO certified containers as per Annex "A" of the contract.

#### **1.4 ACRONYMS AND ABBREVIATIONS**

For acronyms and abbreviations, refer to Section 8.

#### **1.5 DRAWINGS FOR THE EXISTING CDS SETS**

All available drawings for the existing CDS sets are listed in Appendix A of the Annex A of the contract. They are provided as a reference only, the contractor is responsible to verify the exactitude of the information provided in these drawings. Canada will not be held responsible / accountable for any discrepancy between the information stated on the drawings and what can be found inside the CDS.

## 2. DOCUMENTS

### 2.1 GOVERNMENT DOCUMENTS

The prescribed versions of the following documents are to form a part of this specification to the extent specified herein. The documents listed below are applicable only as set out in this SOW. The revisions of the documents listed below are those in effect as of the date shown on the title page of this SOW.

**Table 1: List of Government Documents**

Item	Document Number	Title
1.	C-87-010-013/MZ-001	Overhaul Instructions Canadian Forces Recompression Chambers (Metric version) (2016-03-01)
2.	C-87-325-A00/MS-001	Operation and Maintenance Instruction Containerized Diving System Recompression Chamber (2007-04-10)
3.	C-87-325-B00/MS-001	Operation and Maintenance Instruction Containerized Diving System Work Shop (WKSP) Container (2007-04-10)
4.	D-87-003-000/SG-001	Canadian Forces Standard – Purity of Compressed Breathing Air and Gases for Divers
5.	C-87-316-000/NY-001	Naval Preventive Maintenance Schedule BAUER K150-3EH High Pressure Air Compressor
6.	C-87-010-013/NY-001	Naval Preventive Maintenance Schedule Recompression Chambers
7.	C-87-279-000/MS-001	Operating and Maintenance Instructions – Oxygen Boost Compressor – Haskel model 51563-66
8.	A-LM-184-001/JS-001	Special Instructions - Repair and Overhaul Contractors 2010-08-25
9.	MIL-STD-1330D(SH)	Precision Cleaning and Testing of Shipboard Oxygen, Helium, HeO <sub>2</sub> , Nitrogen and Helium Systems (2007-06-28)
10.	C-87-010-000/TB-004	Cleaning Policy for CF Diving and Breathing Gas Systems, Equipment and Parts.

## 2.2 NON GOVERNMENT DOCUMENTS

Where standards are referenced in this document, unless specifically directed, the whole standard shall apply. Where applicable, the title will indicate what tailoring is required by the Technical Authority (TA).

If any referenced Military Standard in Table 2 has been superseded by a new revision or it has become obsolete and it has been replaced by a new standard or it has not been replaced, then the Contractor shall use the latest revision or replaced standard or an equivalent standard respectively.

**Table 2: List of Non-Government Documents**

Item	Standard	Title
1.	MIL-HDBK-881C 3 Oct 2011	Department of Defence Handbook Work Breakdown structures for Defence Materials Items
2.	MIL-STD-1388 1A	Military Standard Logistic Support Analysis Guidelines and Requirements
3.	MIL-STD-1388 2B	Military Standard DOD Requirements for Logistics Support Analysis Record
4.	MIL-STD-1521B	Technical Reviews and Audits for Systems, Equipment, and Computer Software
5.	MIL-STD-973	Configuration Management
6.	MIL-STD-810G	Environmental Engineering Considerations and Laboratory Tests
7.	US Federal Std 595C	Federal Standard 595 Paint Spec
8.	MIL-STD-1622 B (SH) with Change 1	Standard Practice for Cleaning of Shipboard Compressed Air Syustems (2006-11-15)

## 2.3 ORDER OF PRECEDENCE

In the event of a conflict between the contents of this document and the applicable portions of the referenced technical documents, the contractor shall inform the Technical Authority (TA) of the differences and request for a resolution.

### 3. CDSA-60M DELIVERY

#### 3.1 GENERAL

To satisfy the requirements of this SOW, the Contractor shall carry the CDSA-60M and coordinate that work with the work to be executed to achieve the requirements of the Annex "A" of the Contract.

##### 3.1.1 Project Management Services

The Contractor shall provide Project Management services as detailed in section 4.

#### 3.2 DELIVERABLES

The Contractor shall re-certify the CDSA for sixty (60) months and deliver the re-certified CDSA various components IAW Table 3 and documentation IAW Table 4.

**Table 3: List of CDSA's Equipment and components to be 60M inspected / overhauled / tested / re-certified.**

Component	Qty	Locations and or Comments
<b>Recompression Chamber</b>	1	Located in the CDSA Recompression Chamber Container (RCC). To be re-certified in accordance with Ref Table 1 Item 1 and Part 7 Section 2 and 3 of Table 1 Item 2.
<b>Workshop applicable components</b>	1	Located in the CDSA WKSP. Applicable components to be re-certified in accordance with Ref Table 1 Item 3.
<b>All Gas Cylinders</b>	14	Located in the CDSA RCC and WKSP. All Gas Cylinders to be re-certified in accordance with Part 5 Section 5 of Ref Table 1 Item 2 and Transport Canada (TC) or Department of Transport (DOT USA) standards.
<b>BAUER K150-3EH High Pressure Air Compressors</b>	2	Located in the CDSA WKSP. To be re-certified in accordance with Ref Table 1 Item 5.
<b>Recompression Chamber hull weldings</b>	1 set	Located in the CDSA RCC. To be inspected and reported in accordance with Ref Table 1 item 1, Part 3, Art 3010.
<b>Replenishment of Consumables</b>	A/R	Located in the CDSA RCC and WKSP. To be replenished and reported in accordance with Part 5 Section 3 of Table 1 Items 2 and 3.
<b>Inspections of CDSA applicable components</b>	A/R	Located in the CDSA RCC and WKSP. Inspections of applicable components in accordance with Part 5 Section 4 of Refs Table 1 Items 2 and 3.
<b>Test of applicable CDSA components</b>	A/R	Located in the CDSA RCC and WKSP. Tests of all applicable CDSA components in accordance with Part 8 of Refs Table 1 Items 2 and 3.
<b>Haskel gas booster pump</b>	1	Located in the CDSA WKSP. Removal and overhaul

Component	Qty	Locations and or Comments
		of the Haskel gas booster pump in accordance with Table 1 Item 7.

**Table 4: Documentation Set**

Title	Qty	Comments
Documentation	1	As per Section Contract Deliverable Requirements List (CDRL) and Data Item Description (DID)

#### **4. PROJECT MANAGEMENT**

##### **4.1 ORGANIZATION**

The Contractor shall have a named Project Manager responsible to carry out the work required for the CDSA-60M.

##### **4.1.1 Project Manager**

The Contractor's Project Manager shall have the authority to plan, direct, control and make decisions for this portion of the Contract.

##### **4.1.2 Contractor's Point of contact**

The Contractor's Project Manager shall be the main point of contact with Canada.

##### **4.2 PROJECT MANAGEMENT PLAN**

The Contractor shall prepare and deliver a Project Management Plan (PMP) IAW CDRL Item CDRL-PM-01 and DID-PM-01 to identify how the Contractor intends to fulfill the project management requirements of this SOW.

##### **4.2.1 Work Breakdown Structure (WBS)**

The Contractor shall structure the WBS IAW MIL-HDBK-881C (section 2.2, Table 2, item 1).

##### **4.2.2 Risk Management Plan**

The Contractor shall address Risk Management plan that establishes procedures for identification, assessment, management, reporting, tracking, reduction and elimination of risks arising from the performance of work.

##### **4.2.3 Configuration Management Plan**

The Contractor shall structure the configuration Management plan as required and IAW ANSI-649B, 2011 (section 2.2, Table 2, item 2).

#### **4.2.4 Integrated Logistic (ILS) Plan**

The Contractor shall structure the ILS IAW MIL-STD 1388 1A and 2B (Section 2.2, Table 2, Items 9 and 10) and A-LM-505-001/AG-001 (section 2.1, Table 1, item 8).

#### **4.2.5 Quality Assurance (QA) Plan**

In Accordance with CDRL-EN-01 and DID-EN-01, the Contractor must submit for acceptance by the Department of National Defence (DND) a Quality Plan prepared according to the latest issue (at contract date) of ISO 10005:2005 "Quality management systems - Guidelines for quality plans" Ref. SACC D5402C, Quality Plan. The Quality Plan must describe how the Contractor will conform to the specified quality requirements of the Contract and specify how the required quality activities are to be carried out, including quality assurance of subcontractors. The Contractor must include a traceability matrix from the elements of the specified quality requirements to the corresponding paragraphs in the Quality Plan.

The documents referenced in the Quality Plan must be made available ten (10) days after contract award to Public Service and Procurement Canada or DND.

Upon acceptance of the Quality Plan by DND, the Contractor must implement the Quality Plan. The Contractor must make appropriate amendments to the Quality Plan throughout the term of the contract to reflect current and planned quality activities. Amendments to the Quality Plan must be acceptable to DND.

All work is subject to Government Quality Assurance performed at the Contractor's or subcontractor's facility, and at the installation site, by TA or designate. While developing its Inspection and Test Plan (ITP), the Contractor must liaise with TA to ensure that all mandatory inspections and tests points required by the contract are identified and integrated in its ITP. In addition of hold points for mandatory inspections by TA or designate, the ITP will also have to identify points of advance notice to TA or designate for optional attendance to inspections and tests.

#### **4.2.6 Set to Work (STW) Plan**

The Contractor shall structure a STW plan to show how each component involved in the CDSA-60M will be prepared IOT be submitted to their respective and applicable Factory Acceptance Tests.

#### **4.2.7 Factory Acceptance Test (FAT) Plan**

The contractor shall develop and submit the FAT plan for the applicable equipment and components of the CDS(A) as per Table 5, to show how each of them shall be tested at the factory. The FAT plan shall be presented to the TA for acceptance.

#### **4.2.8 Site Acceptance Test (SAT) Plan**

During the SAT, the Contractor shall provide a Field Service Representative (FSR) to witness and correct any deficiencies related to its work. The SAT IAW Table 10 of the Contract Annex "A" will be carried out by DND at DND's facility. Following a satisfactory SAT, the Work acceptance will take place.

## **5. CDSA-60M REQUIREMENTS**

### **5.1 WORK PREMISES SITE**

The contractor shall conduct all work inside a clean and dry sheltered area. The work premises / site shall provide a level of cleanliness that allows work on diving system of this type. The work premises / site shall be as per facility cleanliness requirement detailed for Controlled Area in accordance with item 10 of Table 1, Chapter 5, Article .1. If at any time during the contract, modification (s) to the work premises / site were to be required in order to meet or maintain the requirements stated under the item 10 of Table 1, Chapter 5, Article 5.1, the modification (s) shall be at the contractor's expense.

### **5.2 RECOMPRESSION CHAMBER (RCC)**

**5.2.1** The contractor shall comply with the General Material and Workmanship requirements in accordance with Articles 2002, 2003, 2101 to 2104 and 2107 to 2109 of Table 1, item 1.

**5.2.2** The contractor shall inspect all chamber seals and door gaskets. Defective chamber seals and door gaskets shall be replaced in accordance with Articles 3120 and 4020 of Table 1, item 1 and Part 6 Section 2 of Table 1, item 2.

### **5.3 GAS DISTRIBUTION SYSTEMS**

#### **5.3.1 HOSES**

The contractor shall recertify all stainless steel outer braid / Teflon core hoses if they were renewed in the last 120 Monthly (120M) overhaul or are less than eight years old in accordance with Article 3210 of Table 1, item 1. If stainless steel outer braid / Teflon core hoses were not replaced last 120 Monthly overhaul or are older than eight years they shall be removed and replaced in accordance with Article 3410 of Table 1 item 1 and 60M2 of Table 1 item 6. Following the inspections of the stainless steel outer braid / Teflon core hoses, the contractor shall dress and submit to the TA's approval a list of all hoses requiring to be renewed. The list shall identify the hoses, types, quantities, sizes, locations, costs and delivery time. After the TA's approval, the stainless steel outer braid / Teflon core hoses renewal will be authorized by the CA in accordance with the contract Terms and Conditions.

All thermoplastic based flexible hoses shall be removed and replaced in accordance with 60M2 of Table 1 item 6. NOTE: All hoses shall be proof-tested and Oxygen cleaned prior to installation and have a tag attached to end of hose with date of test.

### 5.3.2 GAUGES

The contractor shall remove, clean, calibrate all metric depth gauges in accordance with Articles 3220 and 3420 of Table 1 item 1.

The contractor shall check accuracy of all inline gauges in situ in accordance with Article 3230 of Table 1 item 1. Faulty line gauges shall be replaced with new equivalents properly cleaned for either breathing air or Oxygen service. NOTE: Replacement inline gauges shall be in metric and imperial scales. Following the inspections of the inline gauges, the contractor shall dress and submit to the TA's approval a list of all inline gauges requiring to be renewed. The list shall identify the gauges, types, quantities, sizes, ranges, locations, costs and delivery time. After the TA's approval, the inline gauges renewal will be authorized by the CA in accordance with the contract Terms and Conditions.

### 5.3.3 RELIEF VALVES

The contractor shall remove, overhaul, adjust/test and reinstall all relief valves in accordance with Articles 3240 and 3440 of Table 1 item 1 and 60M9 of Table 1 item 6. Testing is to provide correct leak free operation at 150 PSIG relieving pressure.

**Important Note:** Relief valves that are factory set and sealed shall be sent to an American Society of Mechanical Engineers (ASME) qualified shop for recertification and accompanied by a Certificate of Compliance (C. of C.). During the relief valve overhaul, the contractor shall dress a list of any repair and or component renewal required that are beyond the overhaul procedures described in the articles 3240 and 3440 of Table 1 item 1 and 60M9 of Table 1 item 6. The list shall identify the relief valves, parts, components types, quantities, sizes, locations, costs and delivery time. After the TA's approval, the additional requirements will be authorized by the CA in accordance with the contract Terms and Conditions.

### 5.3.4 VARIOUS VALVES AND PRESSURE REGULATORS

The contractor shall remove, overhaul test and reinstall all soft seal ball, shutoff, metering and check valves, and, soft seal TESCO pressure regulators in accordance with Articles 3250, 3320 and 3450 of Table 1 item 1, Part 6 Section 2 of Table 1 item 3 and 60M3 of Table 1 item 6. During the overhaul, the contractor shall dress a list of any repair and or component renewal required that are beyond the overhaul procedures described in the articles 3250, 3320 and 3450 of Table 1 item 1, Part 6 Section 2 of Table 1 item 3 and 60M3 of Table 1 item 6. The list shall identify the parts, components types, quantities, sizes, locations, costs and delivery time. After the TA's approval, the additional requirements will be authorized by the CA in accordance with the contract Terms and Conditions.

### 5.3.5 VARIOUS PIPING

The contractor shall flush clean internal pipework for High Pressure (HP) Air, Helium Oxygen (HeO<sub>2</sub>) and Oxygen (O<sub>2</sub>) systems in accordance with procedures that complies with Table 1 item 1 and Cleaning Policy for CF Diving and Breathing Gas Systems and Article 3310 of Table 1 item 1.

The contractor shall leak test all flushed piping system with gas at maximum pressure in accordance with Article 5010 of Table 1 item 1 and Part 7 Section 4, Page 7-4-6 paragraph 9 of Table 1 item 2.

The contractor shall demonstrate proof of cleanliness of piping in accordance with Table 1 item 10. The contractor shall take Air and Gas samples in accordance with Article 5020 of Table 1 item 1 and CDS Container replacement SOW, Chapter 6, Article 6.1.3. The Air and Gas sample will be sent for analysis by DND Staff. The contractor shall re-clean any system that does not pass the Department of National Defense Standard as per Table 1 item 4.

#### **5.4 FIRE EXTINGUISHING SYSTEM**

The contractor shall overhaul all globe valves fitted on the Fire Extinguishing System in accordance with Original Equipment Manufacturer (OEM) recommendation, and clean them in accordance with Articles 3320 of Table 1 item 1 and Part 7 Section 4 and test them in all three zones in accordance with Part 8 Section 3 of Table 1 item 2.

#### **5.5 INTERNAL BATTERIES**

The contractor shall replenish the internal batteries in accordance with Part 5, Section 3 of Table 1 item 2.

#### **5.6 PURIFICATION SYSTEMS**

The contractor shall overhaul and clean purification systems in accordance with Table 2 item 8.

#### **5.7 GAS CYLINDERS**

The contractor shall perform a sixty monthly (60M) preventive maintenance on fourteen (14) gas cylinders located in CDS RCC in accordance with Part 5 Section 5 of Table 1 item 2 and Transport Canada (TC) or Department of Transport (DOT USA) standards. All gas cylinders shall be cleaned of all scale, hydro-tested to 1.5 times working pressure and certified clean for oxygen service.

All gas cylinders are 3AA Department Of Transport (DOT USA). Recertification shall be in accordance with Department Of Transport regulations for 5 year recertification. Some Department of Transport (DOT) 3AA cylinders may be observed to have neck threads containing defects from original manufacture. There are no spare 3AA cylinders held. Accordingly, the existing cylinders shall be made good by chasing the threads if required and the inlet valves reinstalled with the careful use of Teflon tape to give a leak free connection.

#### **5.8 HASKEL BOOSTER PUMP**

The contractor shall overhaul and test the Haskel Booster pump in accordance with Table 1 item 7.

#### **5.9 BAUER K150-3EH HIGH PRESSURE AIR COMPRESSOR**

The contractor shall perform the 1000 hour preventive maintenance on the two BAUER K150-3EH High Pressure Air Compressors in accordance with Table 1 item 5. The 1000 hour preventive maintenance on the two BAUER K150-3EH High Pressure Air Compressors, the purification system maintenance and the tower recertification shall be executed by or under the technical advice of a registered BAUER representative.

#### **5.10 OTHER INSTRUCTIONS**

Lubricants shall be approved for oxygen systems. The only acceptable lubricant to be used for the HP Diver Breathing gas systems shall be in accordance with the NATO Stock Number 9150-01-441-9016. Lubricants shall be applied sparingly.

It is recommended that all replacement parts and kits be oxygen pre-cleaned to keep on-site cleaning requirements to a minimum.

#### **5.11 OTHER INSPECTIONS**

The contractor shall perform all Inspections listed in Part 5 Section 4 of Table 1 items 2 and 3.

## **6. ACCEPTANCE TESTING**

The purpose of the acceptance tests is to demonstrate that the CDSA-60M performance and functional requirements have been satisfactorily met.

### **6.1 RECORDS FORMS**

All record forms shall be filled out in full, signed and dated and then submitted to TA for review and acceptance as per paragraphs 5.3.2, 5.3.3, 5.3.5, 5.8, and 6 of this document. Since this overhaul was done during the CDS containers replacement, the TA will review all documentation, who will then send this information for review to the Fleet Technical Authority (FTA). The MARLANT Fleet Technical Authority (FTA) is Mr. Dave Brideaux, 902-427-3865.

### **6.2 SET TO WORK (STW)**

#### **6.2.1 Set to Work Procedures**

In preparation for the FAT, all equipment and components involved into the CDSA-60M shall be Set-to-Work. The Contractor shall provide the TA with a Set to Work procedures that will be in line with the Test Plan and the Test Procedure listed in section 6.4 below. These procedures shall be in line with the methodologies applicable to the various systems equipment and components being involved into the CDSA-60M.

As an example and not limited to, all components of the Diving Support Equipment such as the gas plumbing, Recompression Chamber, compressors and air/gas cylinder banks shall be clean and free from grease and oil. Surfaces are to be cleaned with soapy water and wiped dry in accordance with Reference to Item 1 of Table 1, Part 2 in its entirety. Solvents such as halogenated hydrocarbons and petroleum-based solutions are not to be used for general external cleaning.

These procedures shall be accepted by the TA prior to beginning the work.

The following systems equipment and components shall be STW:

- a. Recompression Chamber;
- b. Workshop applicable components;
- c. All Gas Cylinders;
- d. BAUER K150-3EH High Pressure Air Compressors; and
- e. Haskel Booster pump New Containers.

The Contractor is required to supply compressed air for the operation of pneumatic tools.

### **6.3 FACTORY ACCEPTANCE TEST (FAT)**

The Contractor shall perform a Factory Acceptance Test on the CDSA. The FAT conduct shall be witnessed and accepted by the TA or its delegated representative.

During the FAT all required gas will be supplied by DND. Consumables shall be supplied by the Contractor.

The contractor shall perform all Performance Tests listed in Part 8, of Table 1 item 2 and 3 and complete the record forms found in Part 8, Figures 8-3-1 to 8-3-11 of Table 1 item 2 and Part 8, Figure 8-1 to 8-5 of Table 1 item 3 for each test. **NOTE:** Copies of the results of all Performance Tests shall be sent to the TA, on completion of testing.

### **6.4 SITE ACCEPTANCE TEST (SAT)**

The SAT will be conducted by DND. The contractor shall provide a Field Service Representative (FSR) for the duration of the SAT. The SAT of the CDSA-60M will require that the MARLANT HQ Boiler Inspector be present to witness the Inspections and tests on the hatches, the dive test, the pressure and leak tests and the Transfer Under Pressure (TUP) test in accordance with SOW for the Removal and Reinstallation of the CDS into new ISO Containers, Annex A Chapter 6, Article 6.4.4.

The TA will coordinate with MARLANT Boiler Inspector to be present during SAT.

### **6.5 TEST MANAGEMENT**

#### **6.5.1 Factory Acceptance Test (FAT) Plan**

The Contractor shall produce and deliver a FAT plan that provides an overall outline of the entire spectrum of test activities for all equipment and components involved into the CDSA-60M IAW CDRL item CDRL-AT-01 and DID-AT-01.

#### **6.5.2 Factory Acceptance Test (FAT) Procedures**

The Contractor shall produce and deliver the CDSA-60M FAT Procedures. The FAT procedures shall contain all conditions, precautions, adjustments, expected test results, tolerances, and a list of the tools and test equipment required to verify the correct operation of all equipment and components involved into the CDSA-60M. The FAT procedures shall be delivered IAW CDRL item CDRL-AT-02 and DID-AT-02.

#### **6.5.3 Factory Acceptance Test (FAT) Reports**

The Contractor shall prepare the CDSA-60M FAT reports and submit them IAW CDRL Item CDRL-AT-03 and DID-AT-03.

**Table 5: Equipment and Components subject to Factory Acceptance Test Certifications**

<b>Equipment and Components</b>	<b>SOW Ref.</b>
Recompression Chamber	Articles 3.2 and 5.2
Workshop and all CDSA applicable components	Articles 3.2, 5.3, 5.4, 5.5, 5.6
All Gas Cylinders	Articles 3.2 and 5.7
BAUER K150-3EH High Pressure Air Compressors	Articles 3.2 and 5.9
Haskel Booster pump	Articles 3.2 and 5.8

#### **6.5.4 Site Acceptance Test (SAT)**

Because of the nature and the complexity of the CDS, the operation of the all equipment and components involved into the CDSA-60M will be conducted by DND.

The contractor shall provide a Field Service Representative (FSR) for the duration of the SAT. The FSR shall witness the SAT and in a case of a malfunction / defect / breakdown of any equipment and components involved into the CDSA-60M, the FSR shall troubleshoot and repair it in order not to delay the SAT. If the FSR was not able to repair the CDS and/or its sub-systems, the FSR shall return until a solution is found.

## **6.6 CERTIFICATION**

### **6.6.1 Certification by Customs Seal Conditions (CSC)**

A Certification from appropriate certifying agency must be obtained for all equipment and components involved into the CDSA-60M.

### **6.6.2 Letter or Certificate of Acceptance**

TA or designate must carry out a final inspection of all equipment and components involved into the CDSA-60M each container to ensure they meet the latest applicable Regulations and Standards, and must take delivery of certificate of compliance (C of C) at the end of Factory Acceptance Trials.

## 7. ACRONYMS AND ABBREVIATIONS

AIL	Action Item List
ASME	American Society of Mechanical Engineers
BAR	Unit of pressure
C of C	Certificate of Compliance
CA	Contracting Authority
CDRL	Contract Deliverable Requirement List
CDS	Containerized Diving System
CDSA	Containerized Diving System (Atlantic)
CDSA-60M	Sixty (60) Month Preventive Maintenance Overhaul routine
CEAA	Canadian Environmental Assessment Act
CFB	Canadian Forces Base
CFQAR	Canadian Forces Quality Assurance Representative
CFTO	Canadian Forces Technical Order
CMP	Configuration Management Plan
CSA	Canadian Standard Association
COTS	Commercial Off The Shelf
CSC	Convention for Safe Containers
DEA	Design Engineering Authority
DID	Data Item Description
DND	Department of National Defence
DOT	Department of Transport (United States of America)
DWG	Drawing
EIP	Equipment Identification Plate
ERN	Equipment Registration Number
FAT	Factory Acceptance Test
FCA	Functional Configuration Audit
FDU (A)	Fleet Diving Unit (Atlantic)
FDU (P)	Fleet Diving Unit (Pacific)
FMF	Forces Maintenance Facility
FMFCB	Forces Maintenance Facility Cape Breton
FMFCS	Forces Maintenance Facility Cape Scott
FMF CS NAVARC	Fleet Maintenance Facility Cape Scott, Naval Architects
FPM	Final Project Meeting
FSR	Field Service Representative
FTA	Fleet Technical Authority
HMC Ships	Her Majesty Canadian Ships

HP	High Pressure
IACS	International Association of Classification Societies Ltd.
IAW	In Accordance With
ISO	International Organization for Standardization
ITP	Inspection and Test Plan
LOI	Letter of Interest
MARLANT	Canadian Maritime Forces Atlantic
MCDV	Maritime Coastal Defence Vessel
MSDS	Material Safety Data Sheet
NATO	North Atlantic Treaty Organization
NDQAR	National Defence Quality Assurance Representative
OEM	Original Equipment manufacturer
PM	Project Manager
PMP	Project Management Plan
PS	Project Schedule
PSIg	Pound per Square Inch gage
PWGSC	Public Works Government Services Canada
QA	Quality Assurance
QAR	Quality Assurance Representative
RCC	Recompression Chamber
RCN	Royal Canadian Navy
RFP	Request for Proposal
SAT	Site Acceptance Test
SME	Subject Matter Expert
SOIQ	Statement of Interest and Qualification
SOW	Statement Of Work
STW	Set to Work
TA	Technical Authority
TC	Transport Canada
TIR	Transport Internationaux Routiers
VCR	Visit Clearance Request
VTC	Video Tele Conferencing
WBS	Work Breakout Structure
WKSP	Workshop

## 8 CONTRACT DELIVERABLE REQUIREMENT LIST (CDRL) AND DATA ITEM DESCRIPTION (DID)

### 8.1 General

#### 8.1.1 Document Changes/Updates

All the approved documents shall be prepared and updated as required by the CDRL. All changes to updated versions of documents shall be identified as follows:

1. On a change page indicating page numbers, paragraph numbers, date of change and reason for change;
2. Within the hard copy, by use of change bars in the side margins of the printed document; and
3. Within the soft copy, using a method appropriate to the authoring tools that clearly differentiates old content from new or revised content.

Proposed amendments and the list of effective pages shall be forwarded to the TA for approval as described in the CDRL.

#### 8.1.2 Deliverable Format and Number of Copies

The number of documentation copies required for each CDRL is defined within each CDRL.

**NOTE: All soft copies of documentation shall be in the original editable source file format, e.g. Microsoft Word 2003.**

#### 8.1.3 Abbreviations:

The following abbreviations are used in the CDRLs and DIDs.

A	Approval	PCA	Physical Configuration Audit
AT	Acceptance Test	PDR	Preliminary Design Review
CA	Contract Award	R	Review
CDR	Critical Design Review	SRR	System Requirements Review
I	Information only	STW	Set To Work
Month	Calendar month	wd	Working day
wks	Weeks	FTP	File Transfer Protocol

## 8.2 CDRL

### 8.2.1 Project Management CDRL Summary

<b>Project Management CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-PM-01	DID-PM-01	Project Management Plan	A	Project Kick Off Meeting date -10 wd	4.2 and 4.4.1
CDRL-PM-02	DID-PM-02	Meeting Agendas	A	Meeting date - 5 wd	4.4.5
CDRL-PM-03	DID-PM-03	Meeting Minutes	A	Meeting date + 5 wd	4.4.7
CDRL-PM-04	DID-PM-04	Project Status Reports	R	5 <sup>th</sup> wd of each month	4.5.1
CDRL-PM-05	N/A	Project Kick Off Meeting	R	CA +6 wks	4.4.1

### 8.2.2 Engineering CDRL Summary

<b>Engineering CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-EN-01	DID-EN-01	Quality Assurance Plan	R	Kick Off Meeting date -10 wd	5.1.1

### 8.2.3 Acceptance Testing CDRL Summary

<b>Acceptance Testing CDRL</b>					
<b>CDRL #</b>	<b>DID #</b>	<b>Deliverable</b>	<b>Review Level</b>	<b>Due</b>	<b>Section in SOW</b>
CDRL-AT-01	DID-AT-01	Factory Acceptance Test Plan	A	STW-10 wd	4.2.6 and 6.4.1
CDRL-AT-02	DID-AT-02	Factory Acceptance Test Procedures	A	STW Test-10 wd	6.4.2
CDRL-AT-03	DID-AT-03	Factory Acceptance Test Reports	R	Acceptance Test+10 wd	6.4.3