

DELIVERY ORDER

FINAL

1. CONTRACT NO. N00178-04-D-4140	2. DELIVERY ORDER NO. EJG1	3. EFFECTIVE DATE 05/01/2008	4. PURCHASE REQUEST NO. N62583-08-NR-55184
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5. ISSUED BY SPECIALTY CENTER ACQUISITIONS NAVFAC CODE RAQN0/NAVAL BASE VENTURA COUNTY 1205 MILL RD BLDG 850 PORT HUENEME CA 93043-4347 theodore.fleet@navy.mil 805-982-2914 Ext. 2914	CODE N62583	6. ADMINISTERED BY DCMA SOUTHERN VIRGINIA 190 BERNARD ROAD, BLDG 117 FORT MONROE VA 23651	CODE S5111A
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7. CONTRACTOR Técnico Corp 831 Industrial Ave. Chesapeake VA 23324	CODE 0NY44	FACILITY	8. DELIVERY DATE See Section F
			9. CLOSING DATE/TIME (hours local time – Block 5 issuing office)
			SET ASIDE TYPE
			10. MAIL INVOICES TO See Section G

11. SHIP TO See Section D	12. PAYMENT WILL BE MADE BY DFAS Columbus Center, South Entitlement Operations P.O. Box 182264 Columbus OH 43213	CODE HQ0338
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13. TYPE OF ORDER	D	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above-numbered contract.
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ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

Técnico Corp

NAME OF CONTRACTOR SIGNATURE TYPED NAME AND TITLE DATE SIGNED

14. ACCOUNTING AND APPROPRIATION DATA
See Section G

15. ITEM NO.	16. SCHEDULE OF SUPPLIES/SERVICES	17. QUANTITY ORDERED/ACCEPTED*	18. UNIT	19. UNIT PRICE	20. AMOUNT
See the Following Pages					

*If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.	21. UNITED STATES OF AMERICA By: Maria R Miller	04/30/2008 CONTRACTING/ORDERING OFFICER	22. TOTAL [REDACTED]
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SECTION	DESCRIPTION	SECTION	DESCRIPTION
B	SUPPLIES OR SERVICES AND PRICES/COSTS	H	SPECIAL CONTRACT REQUIREMENTS
C	DESCRIPTION/SPECS/WORK STATEMENT	I	CONTRACT CLAUSES
D	PACKAGING AND MARKING	J	LIST OF ATTACHMENTS
E	INSPECTION AND ACCEPTANCE		
F	DELIVERIES OR PERFORMANCE		
G	CONTRACT ADMINISTRATION DATA		

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GENERAL INFORMATION

This is a new requirement.

IMPORTANT: All offerors submitting a proposal in response to this solicitation shall notify Theodore Fleet via e-mail at theodore.fleet@navy.mil at the same time of proposal submission stating that they have submitted a proposal through the SeaPort-e portal.

Amendment 2 is as follows:

1. Solicitation's closing date has been extended from March 3 to March 10, 2008.

Amendment 1 is as follows:

1. Add list of key personnel to Section L, Subfactor C. Key Personnel/Resumes as follows:
 1. Program Manager
 2. Field Supervisor
 3. Quality Assurance
 4. Welder
 5. Clean Room Technician
2. Replace last schematic on page 43 of the attached NDSTC POOL Spec SOW (See attachment 2).

TASK ORDER AWARD ISSUED AND FULLY FUNDED.

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SECTION B SUPPLIES OR SERVICES AND PRICES

CLIN - SUPPLIES OR SERVICES

For FFP Items:

Item	Supplies/Services Qty	Unit	Unit Price	Total Price
2000	Clin 2000 - Provide services to procure Lock Out Trainer (LOT) and Hyperbaric Systems. (OTHER)	1.0 Lot		

The proposed Task Order type will be firm fixed price (FFP).

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SECTION C DESCRIPTIONS AND SPECIFICATIONS

See attachment 1 - Statement of Work.

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SECTION D PACKAGING AND MARKING

Packaging and Marking shall be in accordance with Section D of the SeaPort-e Multiple Award Basic Contract.

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SECTION E INSPECTION AND ACCEPTANCE

Upon completion of all work and final submission of all data items, the contractor's Senior Technical Representative shall prepare and sign a Certificate of Final Acceptance memorandum, and submit it to the TOM for signature. The contractor shall include the fully signed memorandum with its final invoice.

Inspection and Acceptance shall be in accordance with Section E of the SeaPort-e Multiple Award IDIQ Basic Contract for Firm Fixed Price Task Orders. Packaging and Marking shall be in accordance with Section D of the SeaPort-e Multiple Award IDIQ Basic Contract.

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SECTION F DELIVERABLES OR PERFORMANCE

All provisions and clauses in Section F of the basic contract apply to this task order, unless otherwise specified in this task order.

F.1 - CLIN - Performance Periods

The period of performance is from date of task order award through 180 days thereafter. Offerors shall provide a proposed completion schedule if different than the period of performance above as part of their technical proposal.

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SECTION G CONTRACT ADMINISTRATION DATA

5252.232-9513 INVOICING AND PAYMENT (WAWF) INSTRUCTIONS (NOV 2006)

(a) Invoices for goods received or services rendered under this contract shall be submitted electronically through Wide Area Work Flow -- Receipt and Acceptance (WAWF):

(1) The vendor shall have their CAGE code activated by calling 866-618-5988. Once activated, the vendor shall self-register at the web site <https://wawf.eb.mil>. Vendor training is available on the Internet at <http://www.wawftraining.com>. Additional support can be obtained by calling the NAVY WAWF Assistance Line: 1-800-559-WAWF (9293).

(2) WAWF Vendor "Quick Reference" Guides are located at the following web site: <http://www.acquisition.navy.mil/navyaos/content/view/full/3521>.

(3) Select the invoice type within WAWF as specified below. Back up documentation (such as timesheets, etc.) can be included and attached to the invoice in WAWF. Attachments created in any Microsoft Office product are attachable to the invoice in WAWF. Total limit for the size of files per invoice is 5 megabytes.

(b) The following information, regarding invoice routing DODAACs, must be entered for completion of the invoice in WAWF:

<p>WAWF Invoice Type:</p>	<p>-- Select 2-in-1 for FFP Services Only.</p> <p>-- Select Combo for Supplies, or Supplies AND FFP Services.</p> <p>-- Select Cost Voucher for all Cost or T&M contracts or CLINs.</p> <p>If none of the above apply, please call 1-800-559-WAWF (9293).</p>
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Issuing Office DODAAC	N62583
Admin Office DODAAC:	Enter Admin Office DODAAC
Inspector DODAAC (usually only used when Inspector & Acceptor are different people):	Enter Inspector DODAAC or leave blank
Ship To DODAAC (for Combo),	N69218
Service Acceptor DODAAC (for 2 in 1),	N69218
Service Approver DODAAC (Cost Voucher)	N69218
Local Processing Office (applicable if DFAS DoDAAC begins with an "N"):	
DCAA Office DODAAC (Used on Cost Voucher's only):	Enter DCAA Office DODAAC
Paying Office DODAAC:	Enter Paying Office DODAAC located in Contract

(c) Contractors approved by DCAA for direct billing will not process vouchers through DCAA, but may submit directly to DFAS. Final voucher submission will be approved by the ACO.

(d) For each invoice / cost voucher submitted for payment, the contractor shall also email the WAWF automated invoice notice directly to the following points of contact:

Name	Email	Phone	Role
Colin McDonald	colin.mcdonald@navy.mil	202-433-5358	TOM
Theodore Fleet	theodore.fleet@navy.mil	805-982-2914	Contract Specialist

G14S CONTRACTOR'S SENIOR TECHNICAL REPRESENTATIVE (AUG 2005)

Contractors: Fill-in the information required below and submit it as an attachment to your proposal. The contractor's senior technical representative, point of contact for performance under this task order is:

Name:

Title:

Mailing Address:

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E-mail Address:

Telephone:

FAX:

G17S TOM APPOINTMENT (AUG 2005)

(a) The Task Order Ordering Officer hereby appoints the following individual as the Task Order Manager (TOM) for this task order:

Name: **Colin McDonald**

Code: CI-OF50

Mailing Address: Naval Facilities Engineering Service Center 720 Kennon St SE Bldg 36 Suite 333
Washington Navy Yard, DC 20374

Telephone: (202) 433-5358

Fax: (202) 433-5089

DSN 432-5358

(b) The TOM is responsible for those specific functions assigned in the Task Order Administration Plan, attached.

(c) Only the Task Order Ordering Officer has the authority to modify the terms of the task order. Therefore, in no event will any understanding, agreement, modification, change order, or other matter deviating from the terms of the basic contract or this task order between the contractor and any other person be effective or binding on the Government. If, in the opinion of the contractor, an effort outside the existing scope of this task order is requested, the contractor shall promptly notify the Task Ordering Office in writing. No action shall be taken by the contractor unless the Task Order Ordering Officer, or basic contract PCO has issued a formal modification.

CONTRACTING OFFICER:

Maria Miller, (805) 982-4414, maria.miller@navy.mil

Specialty Center Acquisitions, NAVFAC (SCAN), Code RAQN0, Naval Base Ventura County, 1205 Mill Rd, Bldg 850, Port Hueneme, CA. 93043-4347

CONTRACT SPECIALIST:


Theodore Fleet
805-982-2914
theodore.fleet@navy.mil

Specialty Center Acquisitions, NAVFAC (SCAN), Code RAQN0, Naval Base Ventura County, 1205 Mill Rd, Bldg 850, Port Hueneme, CA. 93043-4347

Please send courtesy copies of invoices to: NAVFAC_SW_SCCC_Invoices@navy.mil and to the above contract specialist.

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Accounting Data

SLINID	PR Number	Amount
2000	N6247008RCS0001	

LLA :
AA 1761205 2561 253 05205 0 068732 2A 8RCS01 AA0080003932
Funding for Clin 2000.

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SECTION H SPECIAL CONTRACT REQUIREMENTS

All provisions and clauses in Section H of the basic contract apply to this task order unless otherwise specified in the task order.

ACCESS TO GOVERNMENT SITES

(a) Contractor personnel shall comply with all current badging and security procedures required to gain access to any government site. The contractor shall ensure that contractor personnel employed on any government site become familiar with and obey activity regulations. Contractor personnel shall not enter restricted areas unless required to do so and until cleared for such entry.

(b) All contractor equipment shall be conspicuously marked for identification. The contractor shall strictly adhere to Federal Occupational Safety and Health Agency (OSHA) Regulations, Environmental Protection Agency (EPA) Regulations, and all applicable state and local requirements.

CONTRACTUAL AUTHORITY AND COMMUNICATIONS

(a) Except as specified in subparagraph (b) below, no order, statement, or conduct of any Government personnel who visit the contractor's facilities or in any other manner communicates with contractor personnel during the performance of this task order shall constitute a change under the Changes clause of this contract.

(b) The contractor shall not comply with any order, direction or request of government personnel unless it is issued in writing and signed by the Contracting Officer, or is pursuant to specific authority otherwise included as a part of this task order.

(c) The Contracting Officer is the only person authorized to approve changes in any of the requirements of this task order and, notwithstanding provisions contained elsewhere in this task order, the said authority remains solely the Contracting Officer's. In the event the contractor effects any change at the direction of any person other than the Contracting Officer, the change will be considered to have been made without authority and no adjustment will be made in the task order price to cover any increase in charges incurred as a result thereof.

WORK WEEK

(a) All or a portion of the effort under this contract will be performed on a Government installation. The normal work week shall be Monday through Friday for all straight time worked. No deviation in the normal workweek will be permitted without express advance approval in writing by the designated Ordering Officer(s) with coordination of the using departments. In the event that the contractor fails to observe the normal work week, any resulting costs incurred by the Government shall be chargeable to the contractor. Work on Center shall be performed during the normal work hours at that location unless differing hours are specified at time of task order award. For purposes of scheduling personnel, the contractor is hereby advised that the Government installation will observe all Federal Government holidays. The contractor is further advised that access to the Government installation may be restricted on these holidays.

(b) In the event any of the above holidays occur on a Saturday or Sunday, then such holiday shall be observed by the contractor in accordance with the practice as observed by the Government employees at the using activity.

(c) In the event the contractor is prevented from performance as the result of an Executive Order or an administrative leave determination applying to the using activity, such time may be charged to leave or indirect charges in accordance with company policy.

KEY PERSONNEL

NAVFAC 5252.237-9301 Substitutions of Key Personnel (June 1994)

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The contractor shall provide complete resumes for proposed substitutions, and any additional information requested by the Contracting Officer. Proposed substitutions should have comparable qualifications to those of the persons being replaced. The Contracting Officer will notify the contractor within 15 days after receipt of all required information of the consent of substitutes. No change in fixed prices may occur as a result of key personnel substitution.

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SECTION I CONTRACT CLAUSES

All provisions and clauses in Section I of the basic contract apply to this task order, unless otherwise specified in this task order.

52.222-41 Service Contract Act (1965)

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SECTION J LIST OF ATTACHMENTS

Attachment 1 - Statement of Work.

Attachment 2 - Attachment replaces existing schematic on page 43 of the SOW.

DELIVERY ORDER

FINAL

1. CONTRACT NO. N00178-04-D-4140	2. DELIVERY ORDER NO. EJG101	3. EFFECTIVE DATE ORIG 05/01/2008 MOD 07/23/2008	4. PURCHASE REQUEST NO. N62583-08-MR-68220
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5. ISSUED BY SPECIALTY CENTER ACQUISITIONS NAVFAC CODE RAQN0/NAVAL BASE VENTURA COUNTY 1205 MILL RD BLDG 850 PORT HUENEME CA 93043-4347 theodore.fleet@navy.mil 805-982-2914 Ext. 2914	CODE N62583	6. ADMINISTERED BY DCMA SOUTHERN VIRGINIA 190 BERNARD ROAD, BLDG 117 FORT MONROE VA 23651	CODE S5111A
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7. CONTRACTOR Técnico Corp 831 Industrial Ave. Chesapeake VA 23324	CODE ONY44	FACILITY	8. DELIVERY DATE See Section F
			9. CLOSING DATE/TIME (hours local time – Block 5 issuing office)
			SET ASIDE TYPE
			10. MAIL INVOICES TO See Section G

11. SHIP TO See Section D	12. PAYMENT WILL BE MADE BY DFAS Columbus Center, South Entitlement Operations P.O. Box 182264 Columbus OH 43218-2264	CODE HQ0338
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13. TYPE OF ORDER	D	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above-numbered contract.
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ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

Técnico Corp	/s/Thomas K. Adkins	Thomas K. Adkins Corporate Contracts Officer	08/19/2008
NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIGNED

14. ACCOUNTING AND APPROPRIATION DATA
See Section G

15. ITEM NO.	16. SCHEDULE OF SUPPLIES/SERVICES	17. QUANTITY ORDERED/ACCEPTED*	18. UNIT	19. UNIT PRICE	20. AMOUNT
See the Following Pages					

*If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.	21. UNITED STATES OF AMERICA By: /s/Cecilia G Marquez	08/19/2008 CONTRACTING/ORDERING OFFICER	22. TOTAL [REDACTED]
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SECTION	DESCRIPTION	SECTION	DESCRIPTION
B	SUPPLIES OR SERVICES AND PRICES/COSTS	H	SPECIAL CONTRACT REQUIREMENTS
C	DESCRIPTION/SPECS/WORK STATEMENT	I	CONTRACT CLAUSES
D	PACKAGING AND MARKING	J	LIST OF ATTACHMENTS
E	INSPECTION AND ACCEPTANCE		
F	DELIVERIES OR PERFORMANCE		
G	CONTRACT ADMINISTRATION DATA		

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GENERAL INFORMATION

1. The purpose of this modification is to provide Lock Out Trunk Facility Modifications as indicated in the attached statement of work. A conformed copy of this Task Order is attached to this modification for information purposes only.
2. Acceptance of this modification by the contractor constitutes an accord and satisfaction and represents payment in full for both time and money and for any and all costs, impact effect, and for delays and disruptions arising out of, or incidental to, the work as herein revised.
3. All other terms and conditions remain unchanged.

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SECTION B SUPPLIES OR SERVICES AND PRICES

CLIN - SUPPLIES OR SERVICES

For FFP Items:

Item	Qty	Unit	Unit Price	Total Price

2000	1.0	Lot	[REDACTED]	[REDACTED]
Clin 2000 - Provide services to procure Lock Out Trainer (LOT) and Hyperbaric Systems. (OTHER)				
2001	1.0	Lot	[REDACTED]	[REDACTED]
Lock Out Trunk Facility Modifications per attached SOW. (OTHER)				

The proposed Task Order type will be firm fixed price (FFP).

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SECTION C DESCRIPTIONS AND SPECIFICATIONS

See attachment 1 - Statement of Work.

See Attachment 2 - MOD 1 Statement of Work.

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SECTION D PACKAGING AND MARKING

Packaging and Marking shall be in accordance with Section D of the SeaPort-e Multiple Award Basic Contract.

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SECTION E INSPECTION AND ACCEPTANCE

Upon completion of all work and final submission of all data items, the contractor's Senior Technical Representative shall prepare and sign a Certificate of Final Acceptance memorandum, and submit it to the TOM for signature. The contractor shall include the fully signed memorandum with its final invoice.

Inspection and Acceptance shall be in accordance with Section E of the SeaPort-e Multiple Award IDIQ Basic Contract for Firm Fixed Price Task Orders. Packaging and Marking shall be in accordance with Section D of the SeaPort-e Multiple Award IDIQ Basic Contract.

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SECTION F DELIVERABLES OR PERFORMANCE

All provisions and clauses in Section F of the basic contract apply to this task order, unless otherwise specified in this task order.

F.1 - CLIN - Performance Periods

The period of performance is from date of task order award through 180 days thereafter. Offerors shall provide a proposed completion schedule if different than the period of performance above as part of their technical proposal.

CONTRACT NO. N00178-04-D-4140	DELIVERY ORDER NO. EJG101	PAGE 6 of 13
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SECTION G CONTRACT ADMINISTRATION DATA

5252.232-9513 INVOICING AND PAYMENT (WAWF) INSTRUCTIONS (NOV 2006)

(a) Invoices for goods received or services rendered under this contract shall be submitted electronically through Wide Area Work Flow -- Receipt and Acceptance (WAWF):

(1) The vendor shall have their CAGE code activated by calling 866-618-5988. Once activated, the vendor shall self-register at the web site <https://wawf.eb.mil>. Vendor training is available on the Internet at <http://www.wawftraining.com>. Additional support can be obtained by calling the NAVY WAWF Assistance Line: 1-800-559-WAWF (9293).

(2) WAWF Vendor "Quick Reference" Guides are located at the following web site: <http://www.acquisition.navy.mil/navyaos/content/view/full/3521>.

(3) Select the invoice type within WAWF as specified below. Back up documentation (such as timesheets, etc.) can be included and attached to the invoice in WAWF. Attachments created in any Microsoft Office product are attachable to the invoice in WAWF. Total limit for the size of files per invoice is 5 megabytes.

(b) The following information, regarding invoice routing DODAACs, must be entered for completion of the invoice in WAWF:

WAWF Invoice Type:	<p>-- Select 2-in-1 for FFP Services Only.</p> <p>-- Select Combo for Supplies, or Supplies AND FFP Services.</p> <p>-- Select Cost Voucher for all Cost or T&M contracts or CLINs.</p> <p>If none of the above apply, please call 1-800-559-WAWF (9293).</p>
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Issuing Office DODAAC	N62583
Admin Office DODAAC:	Enter Admin Office DODAAC
Inspector DODAAC (usually only used when Inspector & Acceptor are different people):	Enter Inspector DODAAC or leave blank
Ship To DODAAC (for Combo),	N69218
Service Acceptor DODAAC (for 2 in 1),	N69218
Service Approver DODAAC (Cost Voucher)	N69218
Local Processing Office (applicable if DFAS DoDAAC begins with an "N"):	
DCAA Office DODAAC (Used on Cost Voucher's only):	Enter DCAA Office DODAAC
Paying Office DODAAC:	Enter Paying Office DODAAC located in Contract

(c) Contractors approved by DCAA for direct billing will not process vouchers through DCAA, but may submit directly to DFAS. Final voucher submission will be approved by the ACO.

(d) For each invoice / cost voucher submitted for payment, the contractor shall also email the WAWF automated invoice notice directly to the following points of contact:

Name	Email	Phone	Role
Colin McDonald	colin.mcdonald@navy.mil	202-433-5358	TOM
Theodore Fleet	theodore.fleet@navy.mil	805-982-2914	Contract Specialist

G14S CONTRACTOR'S SENIOR TECHNICAL REPRESENTATIVE (AUG 2005)

Contractors: Fill-in the information required below and submit it as an attachment to your proposal. The contractor's senior technical representative, point of contact for performance under this task order is:

Name:

Title:

Mailing Address:

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E-mail Address:

Telephone:

FAX:

G17S TOM APPOINTMENT (AUG 2005)

(a) The Task Order Ordering Officer hereby appoints the following individual as the Task Order Manager (TOM) for this task order:

Name: **Colin McDonald**

Code: CI-OF50

Mailing Address: Naval Facilities Engineering Service Center 720 Kennon St SE Bldg 36 Suite 333
Washington Navy Yard, DC 20374

Telephone: (202) 433-5358

Fax: (202) 433-5089

DSN 432-5358

(b) The TOM is responsible for those specific functions assigned in the Task Order Administration Plan, attached.

(c) Only the Task Order Ordering Officer has the authority to modify the terms of the task order. Therefore, in no event will any understanding, agreement, modification, change order, or other matter deviating from the terms of the basic contract or this task order between the contractor and any other person be effective or binding on the Government. If, in the opinion of the contractor, an effort outside the existing scope of this task order is requested, the contractor shall promptly notify the Task Ordering Office in writing. No action shall be taken by the contractor unless the Task Order Ordering Officer, or basic contract PCO has issued a formal modification.

CONTRACTING OFFICER:

Cecilia Marquez cecilia.marquez@navy.mil

Specialty Center Acquisitions, NAVFAC (SCAN), Code RAQN0, Naval Base Ventura County, 1205 Mill Rd, Bldg 850, Port Hueneme, CA. 93043-4347

CONTRACT SPECIALIST:

Theodore Fleet
805-982-2914
theodore.fleet@navy.mil

Specialty Center Acquisitions, NAVFAC (SCAN), Code RAQN0, Naval Base Ventura County, 1205 Mill Rd, Bldg 850, Port Hueneme, CA. 93043-4347

Please send courtesy copies of invoices to: NAVFAC_SW_SCCC_Invoices@navy.mil and to the above contract specialist.

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Accounting Data

SLINID	PR Number	Amount
2000	N6247008RCS0001	[REDACTED]

LLA :
AA 1761205 2561 253 05205 0 068732 2A 8RCS01 AA0080003932
Funding for Clin 2000.

MOD 1

2001	N6921808RC10092	[REDACTED]
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LLA :
AB AA 97X4930 NH5A 000 77777 0 068894 2F 000000 00008RC10092
Standard Number: N6921808RC10092

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SECTION H SPECIAL CONTRACT REQUIREMENTS

All provisions and clauses in Section H of the basic contract apply to this task order unless otherwise specified in the task order.

ACCESS TO GOVERNMENT SITES

(a) Contractor personnel shall comply with all current badging and security procedures required to gain access to any government site. The contractor shall ensure that contractor personnel employed on any government site become familiar with and obey activity regulations. Contractor personnel shall not enter restricted areas unless required to do so and until cleared for such entry.

(b) All contractor equipment shall be conspicuously marked for identification. The contractor shall strictly adhere to Federal Occupational Safety and Health Agency (OSHA) Regulations, Environmental Protection Agency (EPA) Regulations, and all applicable state and local requirements.

CONTRACTUAL AUTHORITY AND COMMUNICATIONS

(a) Except as specified in subparagraph (b) below, no order, statement, or conduct of any Government personnel who visit the contractor's facilities or in any other manner communicates with contractor personnel during the performance of this task order shall constitute a change under the Changes clause of this contract.

(b) The contractor shall not comply with any order, direction or request of government personnel unless it is issued in writing and signed by the Contracting Officer, or is pursuant to specific authority otherwise included as a part of this task order.

(c) The Contracting Officer is the only person authorized to approve changes in any of the requirements of this task order and, notwithstanding provisions contained elsewhere in this task order, the said authority remains solely the Contracting Officer's. In the event the contractor effects any change at the direction of any person other than the Contracting Officer, the change will be considered to have been made without authority and no adjustment will be made in the task order price to cover any increase in charges incurred as a result thereof.

WORK WEEK

(a) All or a portion of the effort under this contract will be performed on a Government installation. The normal work week shall be Monday through Friday for all straight time worked. No deviation in the normal workweek will be permitted without express advance approval in writing by the designated Ordering Officer(s) with coordination of the using departments. In the event that the contractor fails to observe the normal work week, any resulting costs incurred by the Government shall be chargeable to the contractor. Work on Center shall be performed during the normal work hours at that location unless differing hours are specified at time of task order award. For purposes of scheduling personnel, the contractor is hereby advised that the Government installation will observe all Federal Government holidays. The contractor is further advised that access to the Government installation may be restricted on these holidays.

(b) In the event any of the above holidays occur on a Saturday or Sunday, then such holiday shall be observed by the contractor in accordance with the practice as observed by the Government employees at the using activity.

(c) In the event the contractor is prevented from performance as the result of an Executive Order or an administrative leave determination applying to the using activity, such time may be charged to leave or indirect charges in accordance with company policy.

KEY PERSONNEL

NAVFAC 5252.237-9301 Substitutions of Key Personnel (June 1994)

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The contractor shall provide complete resumes for proposed substitutions, and any additional information requested by the Contracting Officer. Proposed substitutions should have comparable qualifications to those of the persons being replaced. The Contracting Officer will notify the contractor within 15 days after receipt of all required information of the consent of substitutes. No change in fixed prices may occur as a result of key personnel substitution.

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SECTION I CONTRACT CLAUSES

All provisions and clauses in Section I of the basic contract apply to this task order, unless otherwise specified in this task order.

52.222-41 Service Contract Act (1965)

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SECTION J LIST OF ATTACHMENTS

Attachment 1 - Statement of Work.

Attachment 2 - Attachment replaces existing schematic on page 43 of the SOW.

Attachment 3 - Mod 1 Statement of Work.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE U	PAGE OF PAGES 1 2	
2. AMENDMENT/MODIFICATION NO. 02	3. EFFECTIVE DATE 01-Apr-2009	4. REQUISITION/PURCHASE REQ. NO. N62583-09-MR-58560		5. PROJECT NO. (If applicable) N/A
6. ISSUED BY SPECIALTY CENTER ACQUISITIONS NAVFAC CODE	N62583	7. ADMINISTERED BY (If other than Item 6) DCMA SOUTHERN VIRGINIA CODE		S5111A
CODE RAQN0/NAVAL BASE VENTURA COUNTY 1205 MILL RD BLDG 850 PORT HUENEME CA 93043-4347 theodore.fleet@navy.mil 805-982-2914 Ext. 2914		2000 Enterprise Parkway, Suite 200 Hampton VA 23666		

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and Zip Code) Técnico Corp 831 Industrial Ave. Chesapeake VA 23324	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
	10A. MODIFICATION OF CONTRACT/ORDER NO. N00178-04-D-4140-EJG1
	10B. DATED (SEE ITEM 13) 01-May-2008
CAGE CODE 0NY44	FACILITY CODE 626112502

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning one (1) copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

<input type="checkbox"/>	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
<input type="checkbox"/>	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
<input checked="" type="checkbox"/>	D. OTHER (Specify type of modification and authority) Spec change within scope 52.243-1(a)(1) and POP Extension 52.243-1 Alt 2

E. IMPORTANT: Contractor is not, is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
SEE PAGE 2

15A. NAME AND TITLE OF SIGNER (Type or print) Thomas K. Adkins, Corporate Contracts Officer		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Cecilia G Marquez, Contracting Officer	
15B. CONTRACTOR/OFFEROR /s/Thomas K. Adkins (Signature of person authorized to sign)	15C. DATE SIGNED 03-Apr-2009	16B. UNITED STATES OF AMERICA BY /s/Cecilia G Marquez (Signature of Contracting Officer)	16C. DATE SIGNED 03-Apr-2009

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GENERAL INFORMATION

The purpose of this modification is to acknowledge and agree to, at no cost to the government, Tecnico's use of a 1/4" FNPT thread-o-let welded to the LOT 3" drain tee (F-780) for installation of the Pressure Switch vs. a bulky configuration of a 1" x 3/4" concentric reducer followed with a 3/4" x 1/4" FNPT concentric reducer originally designed (see attachment #4, drawing #3921140) and extend the period of performance until 31 May 2009. All other terms and conditions remain unchanged.

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SECTION B SUPPLIES OR SERVICES AND PRICES

CLIN - SUPPLIES OR SERVICES

For FFP Items:

Item	Supplies/Services Qty	Unit	Unit Price	Total Price
2000	Clin 2000 - Provide services to procure Lock Out Trainer (LOT) and Hyperbaric Systems. (OTHER)	1.0 Lot		
2001	Lock Out Trunk Facility Modifications per attached SOW. (OTHER)	1.0 Lot		

The proposed Task Order type will be firm fixed price (FFP).

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SECTION C DESCRIPTIONS AND SPECIFICATIONS

See attachment 1 - Statement of Work.

See Attachment 2 - MOD 1 Statement of Work.

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SECTION D PACKAGING AND MARKING

Packaging and Marking shall be in accordance with Section D of the SeaPort-e Multiple Award Basic Contract.

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SECTION E INSPECTION AND ACCEPTANCE

Upon completion of all work and final submission of all data items, the contractor's Senior Technical Representative shall prepare and sign a Certificate of Final Acceptance memorandum, and submit it to the TOM for signature. The contractor shall include the fully signed memorandum with its final invoice.

Inspection and Acceptance shall be in accordance with Section E of the SeaPort-e Multiple Award IDIQ Basic Contract for Firm Fixed Price Task Orders. Packaging and Marking shall be in accordance with Section D of the SeaPort-e Multiple Award IDIQ Basic Contract.

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SECTION F DELIVERABLES OR PERFORMANCE

All provisions and clauses in Section F of the basic contract apply to this task order, unless otherwise specified in this task order.

F.1 - CLIN - Performance Periods

The period of performance is from date of task order award through 180 days thereafter. Offerors shall provide a proposed completion schedule if different than the period of performance above as part of their technical proposal.

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SECTION G CONTRACT ADMINISTRATION DATA

5252.232-9513 INVOICING AND PAYMENT (WAWF) INSTRUCTIONS (NOV 2006)

(a) Invoices for goods received or services rendered under this contract shall be submitted electronically through Wide Area Work Flow -- Receipt and Acceptance (WAWF):

(1) The vendor shall have their CAGE code activated by calling 866-618-5988. Once activated, the vendor shall self-register at the web site <https://wawf.eb.mil>. Vendor training is available on the Internet at <http://www.wawftraining.com>. Additional support can be obtained by calling the NAVY WAWF Assistance Line: 1-800-559-WAWF (9293).

(2) WAWF Vendor "Quick Reference" Guides are located at the following web site: <http://www.acquisition.navy.mil/navyaos/content/view/full/3521>.

(3) Select the invoice type within WAWF as specified below. Back up documentation (such as timesheets, etc.) can be included and attached to the invoice in WAWF. Attachments created in any Microsoft Office product are attachable to the invoice in WAWF. Total limit for the size of files per invoice is 5 megabytes.

(b) The following information, regarding invoice routing DODAACs, must be entered for completion of the invoice in WAWF:

WAWF Invoice Type:	<p>-- Select 2-in-1 for FFP Services Only.</p> <p>-- Select Combo for Supplies, or Supplies AND FFP Services.</p> <p>-- Select Cost Voucher for all Cost or T&M contracts or CLINs.</p> <p>If none of the above apply, please call 1-800-559-WAWF (9293).</p>
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Issuing Office DODAAC	N62583
Admin Office DODAAC:	Enter Admin Office DODAAC
Inspector DODAAC (usually only used when Inspector & Acceptor are different people):	Enter Inspector DODAAC or leave blank
Ship To DODAAC (for Combo),	N69218
Service Acceptor DODAAC (for 2 in 1),	N69218
Service Approver DODAAC (Cost Voucher)	N69218
Local Processing Office (applicable if DFAS DoDAAC begins with an "N"):	
DCAA Office DODAAC (Used on Cost Voucher's only):	Enter DCAA Office DODAAC
Paying Office DODAAC:	Enter Paying Office DODAAC located in Contract

(c) Contractors approved by DCAA for direct billing will not process vouchers through DCAA, but may submit directly to DFAS. Final voucher submission will be approved by the ACO.

(d) For each invoice / cost voucher submitted for payment, the contractor shall also email the WAWF automated invoice notice directly to the following points of contact:

Name	Email	Phone	Role
Colin McDonald	colin.mcdonald@navy.mil	202-433-5358	TOM
Theodore Fleet	theodore.fleet@navy.mil	805-982-2914	Contract Specialist

G14S CONTRACTOR'S SENIOR TECHNICAL REPRESENTATIVE (AUG 2005)

Contractors: Fill-in the information required below and submit it as an attachment to your proposal. The contractor's senior technical representative, point of contact for performance under this task order is:

Name:

Title:

Mailing Address:

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E-mail Address:

Telephone:

FAX:

G17S TOM APPOINTMENT (AUG 2005)

(a) The Task Order Ordering Officer hereby appoints the following individual as the Task Order Manager (TOM) for this task order:

Name: **Colin McDonald**

Code: CI-OF50

Mailing Address: Naval Facilities Engineering Service Center 720 Kennon St SE Bldg 36 Suite 333
Washington Navy Yard, DC 20374

Telephone: (202) 433-5358

Fax: (202) 433-5089

DSN 432-5358

(b) The TOM is responsible for those specific functions assigned in the Task Order Administration Plan, attached.

(c) Only the Task Order Ordering Officer has the authority to modify the terms of the task order. Therefore, in no event will any understanding, agreement, modification, change order, or other matter deviating from the terms of the basic contract or this task order between the contractor and any other person be effective or binding on the Government. If, in the opinion of the contractor, an effort outside the existing scope of this task order is requested, the contractor shall promptly notify the Task Ordering Office in writing. No action shall be taken by the contractor unless the Task Order Ordering Officer, or basic contract PCO has issued a formal modification.

CONTRACTING OFFICER:

Cecilia Marquez cecilia.marquez@navy.mil

Specialty Center Acquisitions, NAVFAC (SCAN), Code RAQN0, Naval Base Ventura County, 1205 Mill Rd, Bldg 850, Port Hueneme, CA. 93043-4347

CONTRACT SPECIALIST:

Theodore Fleet
805-982-2914
theodore.fleet@navy.mil

Specialty Center Acquisitions, NAVFAC (SCAN), Code RAQN0, Naval Base Ventura County, 1205 Mill Rd, Bldg 850, Port Hueneme, CA. 93043-4347

Please send courtesy copies of invoices to: NAVFAC_SW_SCCC_Invoices@navy.mil and to the above contract specialist.

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Accounting Data

SLINID	PR Number	Amount
2000	N6247008RCS0001	[REDACTED]

LLA :
AA 1761205 2561 253 05205 0 068732 2A 8RCS01 AA0080003932
Funding for Clin 2000.

MOD 1

2001	N6921808RC10092	[REDACTED]
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LLA :
AB AA 97X4930 NH5A 000 77777 0 068894 2F 000000 00008RC10092
Standard Number: N6921808RC10092

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SECTION H SPECIAL CONTRACT REQUIREMENTS

All provisions and clauses in Section H of the basic contract apply to this task order unless otherwise specified in the task order.

ACCESS TO GOVERNMENT SITES

(a) Contractor personnel shall comply with all current badging and security procedures required to gain access to any government site. The contractor shall ensure that contractor personnel employed on any government site become familiar with and obey activity regulations. Contractor personnel shall not enter restricted areas unless required to do so and until cleared for such entry.

(b) All contractor equipment shall be conspicuously marked for identification. The contractor shall strictly adhere to Federal Occupational Safety and Health Agency (OSHA) Regulations, Environmental Protection Agency (EPA) Regulations, and all applicable state and local requirements.

CONTRACTUAL AUTHORITY AND COMMUNICATIONS

(a) Except as specified in subparagraph (b) below, no order, statement, or conduct of any Government personnel who visit the contractor's facilities or in any other manner communicates with contractor personnel during the performance of this task order shall constitute a change under the Changes clause of this contract.

(b) The contractor shall not comply with any order, direction or request of government personnel unless it is issued in writing and signed by the Contracting Officer, or is pursuant to specific authority otherwise included as a part of this task order.

(c) The Contracting Officer is the only person authorized to approve changes in any of the requirements of this task order and, notwithstanding provisions contained elsewhere in this task order, the said authority remains solely the Contracting Officer's. In the event the contractor effects any change at the direction of any person other than the Contracting Officer, the change will be considered to have been made without authority and no adjustment will be made in the task order price to cover any increase in charges incurred as a result thereof.

WORK WEEK

(a) All or a portion of the effort under this contract will be performed on a Government installation. The normal work week shall be Monday through Friday for all straight time worked. No deviation in the normal workweek will be permitted without express advance approval in writing by the designated Ordering Officer(s) with coordination of the using departments. In the event that the contractor fails to observe the normal work week, any resulting costs incurred by the Government shall be chargeable to the contractor. Work on Center shall be performed during the normal work hours at that location unless differing hours are specified at time of task order award. For purposes of scheduling personnel, the contractor is hereby advised that the Government installation will observe all Federal Government holidays. The contractor is further advised that access to the Government installation may be restricted on these holidays.

(b) In the event any of the above holidays occur on a Saturday or Sunday, then such holiday shall be observed by the contractor in accordance with the practice as observed by the Government employees at the using activity.

(c) In the event the contractor is prevented from performance as the result of an Executive Order or an administrative leave determination applying to the using activity, such time may be charged to leave or indirect charges in accordance with company policy.

KEY PERSONNEL

NAVFAC 5252.237-9301 Substitutions of Key Personnel (June 1994)

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The contractor shall provide complete resumes for proposed substitutions, and any additional information requested by the Contracting Officer. Proposed substitutions should have comparable qualifications to those of the persons being replaced. The Contracting Officer will notify the contractor within 15 days after receipt of all required information of the consent of substitutes. No change in fixed prices may occur as a result of key personnel substitution.

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SECTION I CONTRACT CLAUSES

All provisions and clauses in Section I of the basic contract apply to this task order, unless otherwise specified in this task order.

52.222-41 Service Contract Act (1965)

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SECTION J LIST OF ATTACHMENTS

Attachment 1 - Statement of Work.

Attachment 2 - Attachment replaces existing schematic on page 43 of the SOW.

Attachment 3 - Mod 1 Statement of Work.

Attachment 4 - Drain Layout Drawing #3921140.

LOCK OUT TRAINER (LOT) AND HYPERBARIC
SYSTEMS FOR THE
JOINT AQUATIC COMBAT DIVER TRAINING
FACILITY (JACDT)
AT
NAVAL SUPPORT ACTIVITY PANAMA CITY,
PANAMA CITY, FL
CONTRACT SPECIFICATION

TABLE OF CONTENTS
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PART C1: GENERAL PARAGRAPHS.

PART C2: OPERATION/PERFORMANCE REQUIREMENTS.

PART C3: PIPING & INSTRUMENTATION (P&I) TECHNICAL
REQUIREMENTS

C3.1 GENERAL REQUIREMENTS.

C3.2 SPECIFIC TO THIS PROJECT.

PART C4: PRESSURE VESSEL FOR HUMAN OCCUPANCY (PVHO) -
NOT APPLICABLE

PART C5: QUALITY ASSURANCE:

C5.1 GENERAL REQUIREMENTS.

C5.2 SPECIFIC TO THIS PROJECT.

PART C6: TABLES & FIGURES.

NOTE: THE SYMBOL "N/A" BESIDE A PARAGRAPH NUMBER INDICATES
THAT NO SPECIFICATION IS INTENDED IN THAT PARAGRAPH.

1. GENERAL PARAGRAPHS

1.1 GENERAL:

1.1.1 INTENTION: It is the declared and acknowledged intention and meaning to procure hyperbaric facilities, as described herein, to include design, fabrication, installation and testing of a new Lock Out Trainer (LOT), to be installed in the Joint Aquatic Combat Diver Training Facility (JACDT), Naval Support Activity (NSA) Panama City, Panama City, FL. This includes flood and drain systems and high-pressure air storage for the LOT, along with all other diver related hyperbaric piping, equipment and instrumentation. The LOT is a Pressure Vessel for Human Occupancy (PVHO). The contractor shall be responsible for all work specified herein. The LOT and all other required hyperbaric facilities shall be complete and useable upon completion of the work.

1.1.2 DESCRIPTION OF WORK: The contractor shall provide all labor and materials for the design, fabrication, installation and testing of the Lock Out Trainer (LOT), along with the design, procurement, fabrication, assembly, shop testing and shipping of the required hyperbaric systems. Further, the contractor shall prepare and submit all documents, records and manuals specified herein. The work consists of:

- a. Provision of the hyperbaric facilities as described herein.
- b. Provision of hyperbaric system manuals.
- c. Submission of the design, fabrication & test documents.

1.1.3 DESCRIPTION OF FACILITIES: The facility is composed of the following systems. Part C6 contains drawings and schematics of the facility. The hyperbaric contractor shall provide the following work:

- a. **LOCK OUT TRAINER:** The LOT shall be fixed to the JACDT pool constructed by the building contractor. The LOT shall be equipped with flooding and draining capabilities.
- b. **HIGH-PRESSURE AIR STORAGE FLASKS:** The flasks will be located in a gas farm adjacent to the pool.
- c. **DIVERS AIR STATIONS:** The divers air stations will be located at each of the corners of the pool.

1.1.4 GOVERNMENT FURNISHED EQUIPMENT: ASME Design Report for LOT will be turned over to the contractor upon request.

1.1.5 EXISTING CONDITIONS: The primary air distribution panel, found in Section C6, is located in the Naval Diving and Salvage Training Center (NDSTC).

1.1.6 LOCATION: The system shall be installed and tested at the NDSTC at NSA Panama City, Panama City, FL.

1.1.7 **TIME OF DELIVERY:** The work shall begin (on the "Start Work date") 15 consecutive calendar days after the "Award Date". The contract completion date is 180 consecutive calendar days after the "Award Date". The "Award Date" is shown in Section A, block 28 of this contract. The contractor shall make no component nor material procurement until after the Preliminary Design has been submitted, unless approval is received from the Contracting Officers Technical Representative (COTR).

1.1.8 Not Used

1.1.9 **"IN KIND" REPLACEMENT DEFINITION:** The in kind replacement of a component is defined as the identical component if the identical component is still in manufacture. In the event the identical component is no longer in manufacture, the replacement component must meet all of the requirements of the original component. The requirements of the original components can usually be obtained from the original supplier/manufacturer. If "in kind" components are not available, then replacement components shall be provided upon review by the COTR to the contractor.

1.1.10 **"HYPERBARIC" TERM:** Anywhere in this specification where the term "Hyperbaric" is used, it shall be assumed (where applicable) to mean "Hyperbaric Systems".

1.2 ADDITIONAL PARAGRAPHS:

1.2.1 **SPECIAL PERFORMANCE REQUIREMENTS DUE TO HAZARDS TO PERSONNEL:** Attention of prospective offerors is called to the fact that this contract calls for the fabrication of life sensitive support systems. Failure to adhere to the highest standards of metallurgy, welding, oxygen cleanliness and workmanship will create severe hazards to persons working on or near these systems when they are pressurized. Failure to meet these requirements may be cause for termination for default, and in any event will be cause for Government rejection of components.

1.2.2 **CONTRACTORS TECHNICAL RESPONSIBILITY:** This specification contains technical requirements to which the contractor must adhere; however, it is the contractor's responsibility to confirm by engineering analysis that component sizes cited herein are adequate to perform the "Operational/ Performance Requirements" cited in Part C2. Typical of such items are pipe sizes, number of high pressure media storage flasks, etc. Data has been provided herein to demonstrate the conceptual feasibility of such a facility. Other technical issues that are not specified herein are at the discretion of the contractor. The contractor shall cite his intentions in these areas in the preliminary design.

1.2.3 **CONFORMANCE REQUIREMENTS:** Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the

drawings and specifications, or which are customarily performed, shall not relieve the contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

1.2.4 CONTRACTOR'S SPECIFICATION CHECK: The contractor shall check all drawings and specifications furnished him immediately upon their receipt and shall promptly notify the Government of any discrepancies. Numbers marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The contractor shall compare all drawings and verify the data before laying out the work and will be responsible for any errors that might have been avoided thereby.

1.2.5 CONTRACTOR'S SITE VERIFICATION CHECK: The contract requires the interface of new material/equipment with existing equipment in the building. The contractor is responsible for on-site verification of existing conditions. The contractor is responsible for the integration of new equipment into existing spaces, and the interface of new equipment with existing systems, such as gas, electrical, water, etc. Prior to the submission of the Final Design, the contractor is responsible for visiting the site to facilitate layout of the work.

1.2.6 STANDARD PRODUCTS: Whenever practical, use will be made of materials and equipment that are standard catalog products of manufacturers regularly engaged in the production of such materials and equipment and shall be the manufacturer's latest standard design that complies with the specification requirements. Where two or more products of a similar type are used, they will be products of the same manufacturer. Where two or more products are of a similar type that the same manufacturer's model number can be used, all the products shall be identical. Where standard products are available which have been proven successful for hyperbaric application, they shall be used. Each major component used in this installation will be clearly marked so that the manufacturer, model, serial number, and the principal characteristics of the item can readily be determined.

1.2.7 DOCUMENT SUBMITTAL SCHEDULE: The following is a summary of the documents that are required to be submitted to the Government. Five copies of each document shall be submitted. Document descriptions are in Part 5, "Quality Assurance". Piecemeal submittal of documents is unacceptable; such submittals shall be returned. Submittals shall be completed and delivered no later than the dates listed below:

a. 60 Days After "Start Work Date":

1. Preliminary Design Package.
2. Quality Assurance Plan (submitted with only first appendix package).

3. Preliminary System Manual Outline (where applicable).
4. Weld Procedures, Welders Qualification and Welder Qualification Records (where applicable).
5. Functional Test Plan, Painting Plan, Hydrostatic Test Plan, Cleaning Procedures and Plan; and gas sample procedures and plan (each where applicable).

c. 30 Days Before Contract Completion Date:

1. Record Drawings.
2. 100% Contractor's Records and Documents.
3. 100% Component Database/Component Manufacturer's Design Data (CMDD).
4. Final System Manual.
5. Gas Sample Reports.
6. Functional Test Records & Reports.
7. Purchase Orders

d. Monthly Report: Each Monthly Submittal shall be delivered no later than 10 days after the beginning of each month and shall include:

1. Project Schedule.
2. Component database (latest revision).
3. Current Progress Report.
4. Drawing Status Report

1.2.8 HYPERBARIC FACILITY CODES AND STANDARDS: The contractor's designs and all other work provided under this contract must assure in all instances that the finished hyperbaric facility conforms to the codes and standards listed below. Areas of conflict shall be brought to the attention of the Government. The issue of the respective code to be used for this contract is the effective code at the time of signing of the contract.

- a. NAVSEA SS521-AA-MAN-010, "U.S. Navy Diving And Manned Hyperbaric Systems Safety Certification Manual".
- b. NAVSEA 0994-LP-001-9010, "U.S. Navy Diving Manual".
- c. NAVFAC DM-39, "Hyperbaric Facilities Design Manual".
- d. NFPA 99, "Health Care Facilities".

1.2.9 REFERENCE SOURCES: Reference publications are cited throughout this specification. The addresses of the sponsoring organizations are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

- a. Military Standards (MIL-STD-, MIL-V-, MIL-Q-, etc.) can be ordered from the following address:

Standardization Documents Order Desk
Building 4 D
700 Robbins Ave
Philadelphia, PA 19111-5094

or

General Services Administration
Specifications and Consumer Information
Distribution Sections (WFSLs)
Washington Navy Yard
Building 197
Washington, DC 20407

- b. Navy/NAVSEA Publications:
Navy Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120
- c. American National Standards Institute (ANSI)
1430 Broadway
New York, New York 10018
Ph: 212-354-3300
- d. American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103
Ph: 215-299-5400
- e. American Society of Mechanical Engineers (ASME)
345 East 47th Street
New York, New York 10017
- f. Compressed Gas Association, INC. (CGA)
1235 Jefferson Davis Highway
Arlington, VA 22202
Ph: 703-979-0900
- g. American Welding Society (AWS)
2501 N.W. 7th Street
Miami, FL 33125
Ph: 305-443-9353
- h. Department of Defense (DOD) publications can be ordered
from the following address:

US Army Adjutant General Publications Center
2800 Eastern Boulevard
Baltimore, Maryland 21220
Ph: 301-671-2533
- i. National Fire Protection Association (NFPA)
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101

Ph: (617) 770-3000

j. Naval Diving & Salvage Training Center (NDSTC)
Procedure Description Number 2, (PD-2)
Standard Drawing Requirements
350 S. Crag Rd.
Panama City, FL 32407
Attn: Brian Dietz
Ph: (850) 235-5231

- 1.2.10 SECURITY REQUIREMENTS:** No employee or representative of the contractor will be permitted on Government property unless he/she furnishes satisfactory proof that he/she is a citizen of the United States or is specifically authorized admittance by the Government.
- 1.2.11 STATION REGULATIONS:** The contractor and his employees and subcontractors shall become familiar with and obey all station regulations including fire, traffic and security regulations. All personnel employed on the station shall keep within the limits of the work and avenues of ingress and egress. Personnel shall not enter any restricted areas unless required to do so and must be cleared for such entry. The contractor's equipment shall be conspicuously marked for identification. A Hot Work chit is required from base Fire Department prior to commencement of subject Hot Work performed at the Facility and a "designated Fire Watch" and appropriate required equipment will be provided by the Contractor.
- 1.2.12 ACCESS TO BUILDING:** Regular working hours shall be an 8 ½ hour period established by the Government between 7 a.m. and 5 p.m. Monday through Friday, excluding Government holidays. The contractor shall make an application for work outside of the regular working hours 15 calendar days prior to such work to the Government.
- 1.2.13 EXISTING CONDITIONS AND EXTRA OBLIGATIONS OF THE CONTRACTOR:** the contractor will be working in a specified section of the building. All other sections of the building other than the hyperbaric sections will be off limits to contractor personnel. The contractor and his employees will not be allowed outside the work area or in adjacent existing buildings without prior approval of the COTR. The contractor shall not use the existing buildings for storage.
- 1.2.14 AVAILABILITY AND USE OF UTILITY SERVICES:** The Government will furnish standard utility services free of charge for the specified installation work and on-site testing. Unique utility requirements are the responsibility of the contractor.
- 1.2.15 STORAGE AREAS:** Unsecured outside space, not to exceed 1500 ft², will be available at the site for use as a storage area. All storage facilities, at the contractor's own expense and in a manner satisfactory to the COTR, shall be installed,

maintained, and removed prior to the final acceptance of the work. Exact location for storage and work areas shall be provided to the contractor upon award of the contract.

1.2.16 COOPERATION WITH NAVAL DIVING & SALVAGE TRAINING CENTER (NDSTC) PERSONNEL: Attention is invited to the fact that normal school operations cannot be interrupted. The contractor shall cooperate and schedule his work to avoid conflict with and interruption of the work of others insofar as practicable. In the case of conflict with normal school operations that cannot be resolved satisfactorily, the matter shall be referred to the Contracting Officer for decision, and such decision shall be final, subject to right of appeal in accordance with the terms of the contract.

1.2.17 RE-ENTRY CONTROL: The following re-entry control procedures are required to be performed by the contractor when breachment of a certification boundary, other than that of the scope of work boundary, is required during this contract. The re-entry control process must be coordinated with Command Engineering Department or Officer and specifically at NDSTC, the process must not conflict with operation or training.

1.2.17.1 PRELIMINARY RE-ENTRY CONTROL: The contractor shall submit to the Command Engineering Department or Officer and the Contracting Officer, at least fifteen (15) days in advance of the desired start date, the following re-entry control information:

- a. Requested Work Boundaries.
- b. Estimated System Down Time (in days).
- c. Desired Start Date.

1.2.17.2 FINAL RE-ENTRY CONTROL DOCUMENTATION: Upon completion of the work requiring re-entry control, the contractor shall submit the following information to the Command Engineering Department or Officer and the Contracting Officer:

- a. Purchase orders with manufacturers letters of compliance.
- b. Weld procedure and welders qualifications.
- c. NDT procedure, results of NDT, and inspector's qualifications.
- d. Flush procedures and results.
- e. Cleaning procedure and results of cleaning.
- f. Hydrostatic test procedure and results.
- g. Joint identification drawings and welding log.
- h. Air sample results.

i. All objective Quality Evidence (OQE) to close the REC.

1.2.18 REPAIR AND RESTORATION: If any process described herein causes damage to other features other existing elements of the described hyperbaric facilities or components or adjacent areas of Facility, it shall be repaired and restored to its original condition using similar methods and identical finish at the Contractor's expense.

1.2.19 HAZARDOUS MATERIALS HANDLING: The contractor is responsible for submitting a list of all Hazardous Materials proposed for use within the scope of the contract. This is including the Material Safety Data Sheets (MSDS) for each separate component, a minimum of 10 days prior to scheduled usage of the materials to the COTR and the Command Engineering Officer to obtain government approval.

All contracting personnel involved in the "on-site" contract performance and or administration must attend a Base Environmental Brief, prior to the start of any work. This can be arranged by the Command Engineering Department or Supply Department personnel through the Base.

All Hazardous materials used and waste generated in the course of the contract that are or must be removed from the Facility and Navy Base, and must be disposed of in the manner as specified by the State code for disposal of non-hazardous and hazardous materials. The contractor is responsible for obtaining the DOT approved shippable containers used to transport the HAZMAT/HAZWASTE receiving facility. Documents signed by the receiving facility once the material reaches it's final destination need to be returned to the Command Engineering Officer and copies forwarded to the Base Environmental Office, for reporting purposes.

END OF SECTION

END OF SECTION

PART C3

3.0 PIPING & INSTRUMENTATION TECHNICAL REQUIREMENTS

3.1 GENERAL REQUIREMENTS:

- 3.1.1 "POWER PIPING":** Hyperbaric piping, valves and components shall conform to the requirements of ANSI B31.1, "Power Piping". This specification refers to paragraphs in B31.1; the referenced B31.1 paragraph numbers are followed by an asterisk for identification purposes (illustration, "Paragraph 100.1.1*"). The piping, valves and components shall conform to the following additional requirements.
- 3.1.2 PIPING:** Paragraph 100.1.1* Scope-After "This code prescribes minimum requirements for the design, material, fabrication, erection, test and inspection of...." add, "Hyperbaric Facilities". "Piping" is defined in paragraph 100.1.1*; piping includes tubing. Whenever pipe is stated in this specification in general terms (i.e., only pipe joints), it shall be assumed to state a requirement for all pipe and tube used.
- 3.1.3 PROVEN COMPONENTS:** Pressure containing components normally covered by ANSI B31.1 shall be in accordance with paragraph 104.7*, therein "components shall be used that have been proven satisfactory by successful performance under comparable US NAVY service conditions". Components for a hyperbaric facility must have proven experience in existing hyperbaric facilities for high pressure air, oxygen and water service. Pressure vessels (other than the PVHO's) shall meet the requirements of ASME, Section VIII, Division 1 or as specified.
- 3.1.4 MATERIAL & COMPONENTS, GENERAL:** Material, components and equipment installed in the piping systems shall be as specified and suitable for the gasses and liquids contained and for the maximum operating temperature and pressure. All valves shall be placed so that they can be easily reached, operated and maintained by a person without extensive system disassembly or the aid of special equipment, such as ladders, or they shall be provided with other means of mechanical operation. Valves shall be placed so that accompanying gauges or other displays are easily read. Pipe and tubing shall be protected from abuse and accidents and be placed for ease of operation, maintenance and replacement.
- 3.1.5 CALIBRATION:** All measuring instruments, gauges, relief valves, process control transmitters, indicators, etc. shall be calibrated. All these items requiring calibration shall have at least twelve months remaining on their respective calibration at the time of the acceptance of the facility. All calibration shall be conducted by a Met-Cal certified calibration shop.
- 3.1.6 MATERIAL PROTECTION:** Equipment and materials shall be properly stored, adequately protected and carefully handled to prevent contamination or damage before and during installation. Equipment

and materials shall be installed, handled, stored and protected in accordance with the manufacturer's recommendations.

- 3.1.7 PERSONNEL PROTECTION:** Belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts located so that any person can come in close proximity thereto shall be fully enclosed or properly guarded. High temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation. Areas of high noise shall be properly posted and adequate safety equipment shall be supplied.
- 3.1.8 MANUFACTURER INSTRUCTIONS:** Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the COTR with the Preliminary Design Submittal. Installation of the product shall not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.
- 3.1.9 O-RING SEALS:** All piping components such as valves, check valves, relief valves, reducers, and similar equipment, shall be installed with O-ring seal unions.
- 3.1.10 CHASES:** All piping and electrical conduit shall run in chases. The chases shall be located so that they do not interfere with operations or maintenance. In Hyperbaric operating spaces the piping, conduit and chases shall be run so as to be of minimal presence to the operators and chamber occupants. The contractor's design shall conform to component manufacturers' requirements.
- 3.1.11 PIPING, GENERAL:** There shall be adequate joints for disassembly, cleaning and inspection. Single lengths of piping shall not exceed 30 feet between unions. All piping installed internal to the chamber shall be configured so as to not interfere with normal operations.
- 3.1.12 PIPING SIZE:** Piping shall be sized to a maximum gas velocity of .8 mach or less.
- 3.1.13 WELDED PIPING AND FITTINGS:** Piping, unless otherwise specified, shall be seamless annealed stainless steel conforming to ASTM A312, Type **304L or 316L**. Pipe shall be 1/2" or larger. All tube, unless otherwise specified, shall be seamless annealed stainless steel conforming to ASTM A269, Type **304L or 316L**. All fittings shall conform to ASTM A403, Type **304L or 316L** and shall be seamless. Tube shall be 1/2" I.D. or larger, except gauge and sampling lines which will be 1/4" or larger. All Piping (pipe, tube, and fittings) located in areas external to the building shall be 316 or 316L. Traceability details (heat numbers etc.) shall be etched or permanently marked on all piping (pipe, tube, fittings, tailpieces, threadpieces, etc).

- 3.1.14 PIPE MATERIAL CERTIFICATIONS:** The contractor shall submit material certifications for all weld filler metal (wire, rods, etc.), pipe and fittings used in this contract. The material certifications shall ensure that the pipe, fittings and filler meet all specification requirements. The material certifications shall include, but are not limited to: complete analysis (chemical element percentage composition), mechanical physical properties including tensile, yield, elongation, and manufacturer and manufacturing details. Vendor supplied purchase orders, Vendor Certificates of Conformance (C of C) and Mill Certs for welded pieces shall accompany all piping (pipe, tube, valves and fittings) IAW US Navy System Certification Manual, SS521-AA-MAN-10.
- 3.1.15 JOINT STANDARDS:** Only pipe joints that are fabricated, erected, tested and inspected to nationally accepted standards may be used (typically; butt welds, socket welds, bolted flange connections, O-ring faced fittings). Others are not acceptable (typically; brazed, byte type, flared, compression fittings and threaded).
- 3.1.16 FLEX HOSES:** Flexible hoses shall be installed at reciprocating machinery. When a flexible hose is to be subjected to considerable vibration or flexing, sufficient slack shall be provided to avoid mechanical loading. Flexible hose burst pressure shall be four times operating pressure. Flexible hoses shall be installed so that operators of the equipment are not endangered. All flexible hoses installed shall be labeled with a metal information tag according to the requirements in the US Navy System Certification Manual, SS521-AA-MAN-010. All flex hoses shall have an independent identification number etched on the metal identification tag and on one of the end fittings. This identification number shall correspond to all documentation related to the respective flex hose (hydrotest, cleaning, etc.) All flexible hoses shall be subjected to a hydraulic proof test equal to twice the rated working pressure of the hose (See NAVSEA S6430-AE-TED-010). All flexible hoses shall be covered with non-corrosive stainless steel wire braid. All fittings shall be constructed of non-corrosive stainless steel.
- 3.1.17 FLEX HOSE RESTRAINER:** All flex hoses shall have restrainers (Safety Lines), fabricated in accordance with the U.S. Navy Diving Manual. Safety lines shall be provided for the full length of each flex hose assembly, securely fastened at both ends. In the case of charging whips, the manifold end shall be securely fastened. The working end shall have a device for securing the line to the cylinder.
- 3.1.18 FITTINGS ID:** The inside diameter of elbows, tees and other fittings shall be equal to or greater than the pipe to which they are attached.
- 3.1.19 PIPING ID:** Identify piping in accordance with Table B-3, Color Code and Component Designation for Diving Systems", NAVSEA SS521-AA-MAN-010. Identification shall apply to piping on each segment of pipe between fittings. All valve handles, operator controls and gauge outer rings shall have color coding applied. Provide two copies of

the piping identification code framed under glass or acrylic and installed where instructed by the COTR.

3.1.20 COMPONENT TAGS: All components shall be tagged with identification plates of plastic laminate measuring approximately on half inch high, by one and one half inches long minimum, by one eighth inch thick, firmly attached by contact adhesive or by other means acceptable to the Government. These plates shall be marked by engraving with one quarter inch high block type identification letters/numbers, and shall be color coded as appropriate. The Component Tag index shall be submitted with the Preliminary Design.

3.1.21 COMPONENT IDENTIFICATION DESIGNATOR (CID): The contractor shall ensure that every component within a system has a unique identification designator consisting of letters and numbers expressed as an alphanumeric code. The assigned component identification designator shall be etched on the component. The assigned component identification designator is used to identify components in an assembly, re-entry control packages, manuals and other types of documents. The component identification designator consists of four main parts:

1. System Usage Designator
2. Component Type
3. Sequential Component Number
4. Augmenting Designator (not used in all cases)

The Usage Designator is separated from the remaining component identification number by a dash. Following the dash are the Component Type and Sequential Component Number, and if an Augmenting Designator is needed (for instance, to separate identical systems), a dash will separate the Sequential Component number and the Designator as shown in the following example: **HEO2-V1234-1**

The Component Identification numbering procedure presented above indicates that the example Component Identification Designator HEO2-V1234-1 identifies the System Usage as Helium/Oxygen Mix, and the component type is a valve, which is the one thousandth two hundredth and thirty fourth component within that (Helium/Oxygen) system. The Augmenting Designator one, at the end of the Component Identification Designator is used when there are identical systems (i.e. Diving Simulation Facility (DSF)).

The contractor shall ensure that all components shall have the following information embedded into the each individual component drawings in the form of attributes on attached to the component designation:

1. Valve Type (Globe, Ball, Air-Operated, etc.)
2. Manufacturer and contact information (address and phone)
3. Model Number of part
4. Repair Kit Identification

The Component Identification Designation shall be conducted in accordance with **PD-2 Section 34** and in accordance with Attribute requirements indicated by **PD-2**.

3.1.21.1 USAGE DESIGNATOR: Each System/Subsystem can be broken down further to identify the type of gas or liquid flowing through the System/Subsystem. The primary Usage Designators are identified in **PD-2 Section 30**.

3.1.21.2 COMPONENT TYPE DESIGNATOR: Component numbers are assigned starting at the upstream end of a piping system and continue in the direction of flow. The Component Designators are identified below:

Designator Number	Component Description
F	Filter
G	Gauge
V	Valve and Quick-Disconnect
C	Controller (Remote Controlled Valves)

3.2.21.3 JOINT IDENTIFICATION: The contractor shall ensure that every joint within a system (both mechanical and welded), has a unique identification designator consisting of letters and numbers expressed as an alphanumeric code. The Joint Identification shall consist of three main parts:

1. System Usage Designator
2. Joint Type
3. Sequential Number

Each part shall be separated from another using a dash as shown in the following example: **HEOX-BW-123**. The same System Usage Designators will be used for Joint Identification that were used for CID's. A list of Joint Types can be found in PD-2 Section 33. Joint Identification and Attribution requirements will be conducted in accordance with PD-2.

3.1.22 PANEL ID TAGS: All panels and major subsystems shall be identified with an ID plate. These plates shall be made of plastic laminate, two inches high and at least six inches long by one-eighth inch thick. The plates shall be marked by engraving with three-quarter inch high block type identification letters/numbers, and shall be color coded as appropriate. All piping entering/leaving a panel shall be identified. These plates shall be made of plastic laminate, 1 1/2 inches high and at least four inches long by one-eighth inch thick. The plates shall be marked by engraving with 1/2-inch high block type identification letters/numbers, and shall be color coded as appropriate. These labels shall be firmly attached by contact adhesive or by other means acceptable to the Government. ID tag wording shall be provided with the Preliminary Design.

- 3.1.23 TUBING GUIDELINES:** There shall be a length of straight tubing adjacent to the nut equal to 2 tube diameters or more. The total length of a tube assembly shall be 20 tube diameters or more. Each tube assembly shall have at least one bend equal to or greater than 90°.
- 3.1.24 THROTTLE VALVES:** All valves that regulate flow (other than on-off function), oxygen service valves, and high pressure valves (except for those remotely actuated) are considered throttle valves. They shall be globe or needle valves. These valves shall conform to MIL-V-24109. For throttle valves which are larger than those that meet the requirements of MIL-V-24109 (3" or greater), these valves shall conform to MIL-V-24109 with respect to control of flow and pressure. Valve Handles shall be color coordinated with Table B-3, Color Code and Component Designation for Diving Systems", NAVSEA SS521-AA-MAN-010.
- 3.1.25 SHUTOFF VALVES:** All hand operated valves, other than throttling valves, shall be ball valves. They shall be two-way (bi-directional) flow, three piece, with a swing out construction, valves conforming to ASME/ANSI B-16.34 and utilizing a soft sealing surface. Socket weld end connections shall conform to ANSI B-16.11. Butt weld end connections shall conform to ANSI B-16.25. The construction materials shall be compatible with air and oxygen service. All valves shall be rated at a working pressure equal to or greater than the maximum possible system pressure. On panels, in which the direction in which the valve handles point indicates the open or closed position, the direction shall be the same for all valves on the panel. Valve handles shall be color coordinated with Table B-3, Color Code and Component Designation for Diving Systems", NAVSEA SS521-AA-MAN-010.
- 3.1.26 COMPONENT SEATS:** Breathing gas components shall have seats and seals that are suitable for oxygen service.
- 3.1.27 LUBRICANTS:** All lubricants shall be suitable for oxygen service.
- 3.1.28 CHECK VALVES:** All check valves shall utilize a soft sealing surface poppet or disc and spring.
- 3.1.29 PRESSURE GAUGES:** Pressure gauges, except as otherwise specified, shall have a 4 1/2 inch dial and shall meet the following criteria:
- a. Unless otherwise specified, shall be made with phosphor bronze or stainless steel, with helical coil or bourdon tube sensing elements.
 - b. The case shall be made of acrylonitrile butadiene styrene plastic and shall have a blowout relief device.
 - c. Oxygen gauges shall be cleaned and marked for oxygen service.
 - d. Oxygen gauges shall have a green outside case.
 - e. Each gauge shall be capable of isolation from the system by a three-way gauge calibration valve, which meets the requirements of MIL-V-24578, and snubber assembly.

f. They shall have an accuracy of 1% full scale unless otherwise specified.

- 3.1.30 GAUGE RANGE:** The full range of pressure gauges shall be 130% to 150% of the maximum operational range.
- 3.1.31 VENT LINES:** Vent lines shall be independent of each other and of other lines. All vents lines shall exhaust outside the building, and shall be so configured and capped to prevent ingress of weather or debris. They shall be designed to provide lightning protection.
- 3.1.32 RELIEF VALVES:** Relief valves installed on PVHO's and on ASME air storage flasks shall conform to and be marked and stamped in accordance with ASME Section VIII, Division 1, "Pressure Vessels". Non ASME coded relief valves shall be installed on systems other than PVHO's and ASME storage flasks. Relief valves shall be located so that the exhaust port is not nearer than 5 feet from operators, the vented gas shall be directed away from operators. Relief valves for piping greater than 1" NPT and for oxygen shall be piped outdoors. All non-ASME coded relief valves shall be adjustable-type relief valves.
- 3.1.33 PIPING CLEANING:** Piping shall be installed to facilitate cleaning. All high points shall be ventable, low points shall be drainable.
- 3.1.34 REDUCTION STATIONS:** Pressure regulating station components shall be selected so that output pressure will not drop below 90% of nominal set pressure for all conditions of flow and upstream pressure; and, maximum flow requirements shall be met under all conditions of upstream pressure and flow. Minimum upstream pressure shall be three times downstream pressure. Provide each pressure reducing station with a regulator, a filter upstream of the regulator, gauges to show the supply pressure, reduced pressure and a safety relief valve on the low pressure side with sufficient capacity to relieve the high pressure. Pressure regulators shall be capable of operating within a temperature range of 32 to 165 degrees Fahrenheit. All dome-loaded regulators shall be provided with appropriate hand loaded regulators for the adjustment of the reduced pressure downstream of the dome-loaded regulator. The exception shall be for the Scuba charge system dome loader, which shall have no hand loader and shall be set to 3300 psig. The exception for filters shall be that no filters shall be provided for maintenance panel or drive air panel regulators. All regulators shall be provided with straight thread o-ring fitting end connections.
- 3.1.35 FILTERS:** Filters shall be provided preceding all pressure regulators, except as noted in the specification or drawings. A filter shall be provided downstream of all externally supplied supply banks ("K bottle banks for oxygen, nitrogen, etc., Liquid oxygen, Liquid nitrogen, etc.) and preceding all dome loaded regulators regardless if not on drawings. All filters, unless otherwise specified, shall be fabricated in accordance with ASME Section VIII Div I, and shall be capable of changing the filter element without removing the filter body from the line. It shall

be capable of removing particulate larger than 10 microns unless otherwise specified. Filters shall be sized so that the pressure drop across a clean filter is not more than 2.5 percent for LP systems (500 psi and less) or not more than 15 psi for HP systems (500 psi and more) of the specified minimum inlet pressure to the regulator at maximum flow rate specified for the regulator. All filters shall be provided with straight thread o-ring fitting end connections.

3.1.36 UNIONS: Unions shall be installed in the piping and each end of the flexible hoses to facilitate removal and maintenance of components.

3.1.37 CONSOLES: The surfaces of consoles that are viewed by operators shall be non-reflective.

3.1.38 PANELS: Control Console's and Control Panels for recompression chambers shall be constructed in a panel mount configuration, with the component bodies behind the panel, and only displays or operating mechanisms exposed, and shall otherwise conform to C3.2.1.k. **All other panels** shall be constructed in an "exposed component, surface mounted" configuration. Panels and mounting brackets shall be fabricated of aluminum. The panels shall be manufactured of a minimum of 1/4" plate. The exposed panel surface and all brackets shall be powder coated to the required color of the panel service after fabrication. The support brackets used to support the pipe and components shall also be powder coated after fabrication. All components on the panel shall be independently supported (pipe shall not be used to support components). Panels that cannot be supported due to their weight shall be supported with leg supports that adequately support the weight of the panels.

3.1.39 WELD JOINT INTERIOR: Paragraph 111* Welded Joints-The finished interior surface of pipe joints shall be smooth in order to reduce noise in the test piping. Backing rings, if used, shall be removed. There shall be no excess reinforcement on the inside of pipe joints caused by the welding process. Machine welding or consumable inserts shall be used in the welding process to avoid any excess reinforcing of the weld. The contractor shall provide a detail description of the weld process in the preliminary design.

3.1.40 WELDING QUALIFICATIONS: Paragraph 127.5* Qualification. All welders, welding procedures, and procedures shall be qualified by the contractor prior to welding on this project. Qualification by a previous employer is unacceptable. The following documents shall be submitted by the contractor:

- a. QW-482 Welding Procedure Specification
- b. QW-483 Procedure Qualification Record
- c. QW-484 Welder or Welding Operator Qualification Test

3.1.41 WELD IDENTIFICATION: All welds shall have weld identification symbols etched on the pipe base metal adjacent to the respective weld. All etched weld numbers shall correspond to the welder log and Joint Identification Drawing (JID). The welders log and JID shall be submitted by the contractor. The welders log and JID

shall contain sufficient information to cross reference between all welding qualifications, welding records, Non-destructive testing (NDT) qualifications, and NDT records. JID etchings will correspond to NDSTC PD-2 Section 32 and 33 requirements.

- 3.1.42 COMPONENT SUPPORTS:** Pipe and/or tubing shall be adequately supported at intervals no greater than 100 pipe diameters, and in both directions at elbows. Components (valves, regulators, etc.) shall be supported so that the force required to operate the component or other normal operational load does not cause visual deflection, rotation nor vibration.
- 3.1.43 CONTAMINATION:** Precautions shall be taken during fabrication to prevent construction dirt from entering pipe in storage or partially completed piping systems.
- 3.1.44 MACHINERY FOUNDATIONS:** Reciprocating machinery shall be on independent foundations, with sound isolation mounts.
- 3.1.45 COMPRESSOR GROUNDING:** Each compressor shall be grounded. Where a ground strap is provided at the isolation pad, the contractor shall connect the compressor to this strap. If no ground strap is provided, the contractor is responsible for installing such ground strap, and grounding the compressor.
- 3.1.46 ALARMS:** Alarms shall be aural and visual. Visual displays shall be LED and press to test. Each aural alarm shall have a manual shut-off. Illuminated visual alarms and displays shall be grouped as safety related or informational. Safety related alarms and displays shall be GREEN, indicating a safe condition; or RED, indicating an unsafe condition. Informational illuminated visual displays shall be WHITE. They shall indicate data such as "OPEN", "SHUT", etc.
- 3.1.47 OXYGEN SYSTEMS:** Oxygen piping shall conform to the requirements of CGA Pamphlet G-4.4, "Industrial Practices for Gaseous-Oxygen Transmission and Distribution Piping Systems". The following are noted:
- a. Pipe and fittings shall be stainless steel ASTM 316L.
 - b. All valves, regulators and other components shall be copper based alloy. All oxygen system valves shall meet the requirements for throttle valves as specified in C3.1.24.
 - c. Pipe joints shall be butt welded.
 - d. Vent lines shall be independent of other lines and shall vent outdoors. The vent line for venting oxygen shall be cleaned as required by this specification.
 - e. The oxygen vent shall be properly isolated from weather, combustibles, personnel, other systems and air compressor intakes.

- f. Components for oxygen systems shall not react with oxygen nor fluorinated compounds in any way that might cause generation of heat or loss of oxygen to the surrounding atmosphere. Such components shall utilize polytetra fluoroethylene (teflon), polychlorotrifluorethylene(Kel-F), or fluoroethylene (Viton) seals and gaskets. All other wetted parts shall be stainless steel or as otherwise specified.
- g. Gauge and sampling piping provided in oxygen systems which are 1/4" tube may have pipe joints which are socket welded. Gauge and sampling piping lengths and the amount of socket weld fittings shall be kept to a minimum.
- h. All oxygen piping shall be grounded.
- i. All filter elements shall be manufactured of bronze or monel.

3.1.48 NON-DESTRUCTIVE EXAMINATION: Mandatory minimum non-destructive examination of welds shall conform to the requirements of Table 136.4* and the following.

WELD TYPE	EXAMINATION
Butt weld.....	RT
Welded branch connections.....	RT for 2" and over. MT or PT for less than 2".
Fillet, socket welds.....	MT or PT all sizes.

NOTES:

- a. Welds shall be given a visual examination in addition to the examination specified above. Acceptance standards for visual examination shall be those of American Welding Society, D1.1, paragraph 8.15.1, "Quality of Welds".
- b. RT=Radiographic Examination (paragraph 136.4.5*)
- c. PT=Liquid Penetrant Exam (paragraph 136.4.4*).
- d. MT=Magnetic Particle Exam (paragraph 136.4.3*).

3.1.49 SYSTEM CLEANING: Pipe that contains gases that will be breathed by humans shall be cleaned.

- a. The contractor shall be responsible for cleaning all new piping and components, and any existing piping and components on which work is performed, to the nearest disassembly joint. Equipment, materials, instruments, personnel and laboratory services required for cleaning and certification shall be provided by the contractor.
- b. The contractor shall submit his cleaning procedures to the Government. Procedures for cleaning the air system must be

consistent with NAVSEA SS521-AA-MAN-010, appendix G. The use of organic solvents as a cleaning agent is prohibited.

- c. Components which are certified clean upon delivery by the manufacturer will not require cleaning if the integrity is not violated. Components which have been shop tested and certified for cleanliness shall be bagged and removed from the system during cleaning operations. Systems may be cleaned as a whole or in sections provided all clean piping is kept isolated and free of contamination after cleaning.
- d. An air gas sample shall be taken from the discharge of each air supply which will be breathed by humans. The total amount of gas samples taken shall ensure that there is analysis of the entire system. An additional sample shall be taken at one of the compressor air inlets. Samples shall be taken after hydrotesting, cleaning and assembly. Air purity shall meet or exceed the standards stated in the U.S. Navy Diving Manual (NAVSEA SS521-AG-PRO-010), Table 4-1, 4-2, 4-3, 4-4, or 4-5. Dew point analysis shall be conducted that confirms that less than -40°F air is being supplied by the compressors.
- e. Gas samples shall be taken at the discharge of all other pipe gas supplies which may be breathed by humans (oxygen, nitrox, heliox,) or used for mixing of breathing supplies (nitrogen, helium, etc.). The total amount of gas samples taken shall ensure that there is analysis of the entire system. Samples shall be taken after hydrotesting, cleaning and assembly. Purity shall meet or exceed the standards stated in the U.S. Navy Diving Manual (NAVSEA SS521-AG-PRO-010), Table 4-1, 4-2, 4-3, 4-4, or 4-5.
- f. Oxygen system cleaning procedures and Gas sample requirements must comply with the requirements of MIL-STD-1330.
- g. All gas samples shall be tested for the presence of unacceptable levels of all agents used in cleaning. An unacceptable level is any level less than 1/10th the maximum OSHA eight (8) hour exposure level for any constituent in the cleaning material.
- h. If liquid cleaning solutions are used requiring final H₂O rinse, the final rinse solution shall be sampled to insure cleaning agents do not remain in the system.

3.1.50 HYDROSTATIC TEST: Paragraph 137* - Leak Test. Piping shall be hydrostatically strength tested to 1-1/2 design pressure.

3.1.51 GAS LEAK TEST: A gaseous leak test shall be conducted after the hydrostatic strength test. The test shall be conducted with air unless otherwise specified. The maximum test pressure shall be the Maximum Operating Pressure. The gas pressure shall be permitted to stabilize as a result of temperature change. All possible sources of pressurization and volume storage (tanks, etc.) shall be isolated from the system. High pressure piping and low pressure piping in systems shall be tested independently.

The maximum test pressure shall be safely brought to maximum operating pressure and held. After allowing for equalization, a bubble test will be performed. The pressure will then be brought to low pressure (50 psi) and left for an extended period of at least 3 hours. The pressure shall not drop.

- 3.1.52 REGULATORS FOR CHAMBER AIR SUPPLY:** The regulators used for the air supply reduction for the chamber headers (panel supplying chamber primary #1 and #2) shall be dome-loaded regulators designed to provide high downstream flows while maintaining accurate control of pressures. The regulator outlet port shall be 1". The regulator shall be made of stainless steel. The regulator shall be designed to receive an inlet pressure of 5000 psig and an outlet pressure of 250 psig. The supply pressure for the chamber control valves (Globe valves for Air #1 and #2) shall be 250 psig. For all chamber supply piping downstream of the regulator, the piping and components shall immediately be increased to the size of the respective chamber penetrator.
- 3.1.53 CHAMBER VENT PIPING:** Vent piping immediately downstream of the chamber vent throttle valves (Globe Valve) shall be increased to a minimum of two diameters larger than the piping upstream of the valve (i.e., 2" upstream - 4" downstream). The use of breathing compatible ABS with non-offgasing adhesive (see compressor intakes) is acceptable. The Vent system length shall be kept to a minimum, changes in vent flow (90's and 45's) shall be kept to a minimum, and all changes in direction shall use long radius bends or fittings.
- 3.1.54 USN PRESSURE TEST:** A pressure test, in accordance with the requirements of the US Navy Diving Manual, Appendix D, shall be conducted on the RCF, after overhaul, and as part of the Final Functional Test. The results shall be submitted to the Government.
- 3.1.55 MUFFLERS:** Unless otherwise specified, mufflers shall be shell type dispersive mufflers with connection size no smaller than associated line size. All mufflers shall be constructed of corrosion resistant stainless steel and all acoustical packing material shall be non-flammable.
- 3.1.56 PRESSURE SWITCHES:** Each pressure switch shall consist of two separate single pole double throw switches, each with an independently adjustable set point and a non-adjustable reset point. All switches shall be protected by line snubbers, enclosed in NEMA 4 enclosures, and rated for 125 VAC/60 Hz supply voltage. Each pressure switch shall be capable of withstanding overpressure equal to the maximum possible pressure of the line in which it is installed.
- 3.1.57 CONTROL CONSOLE PANEL SURFACE TEMPERATURE:** The contractor shall ensure that the temperature of the front panels and operating controls shall not exceed 100 degrees Fahrenheit when the ambient

temperature is 75 degrees when equipment is installed into the Control Consoles. Forced ventilation shall be provided if necessary.

3.1.58 CIRCUIT BREAKERS: FS W-C-375 thermal magnetic-type with interrupting capacity of 10,000 amperes symmetrical minimum. Breaker terminals shall be UL listed as suitable for type of conductor provided. Plug-in circuit breakers are unacceptable. Contractor shall provide compatible circuit breakers in existing (Government furnished, government installed) panels when required to make connections to these panels. The contractor shall ensure that all power provided to hyperbaric systems is Ground Fault Interrupter (GFI) protected.

3.1.59 INSTALLATION WIRING METHODS: Provide insulated conductors installed in conduit, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Provide insulated, green equipment grounding conductor shall be separate from electrical system neutral conductor. Provide insulated, green conductor for grounding conductors installed in conduit or raceways. Minimum conduit size shall be 3/4 inch in diameter for low voltage lighting and power circuits. Conduit which penetrates fire walls, fire partitions, or floors shall be metallic on both sides of fire walls, fire partitions, or floors for minimum distance of 6 inches.

3.1.59.1 ALUMINUM CONDUIT: Do not install underground or encase in concrete. Do not use brass or bronze fittings.

3.2 SPECIFIC TO PROJECT:

3.2.2 LOCK OUT TRAINER (LOT) OUTFITTING: The LOT shall be outfitted as detailed below. The use of each penetrator shall be as specified in part C6. Piping and components shall be sized consistent with the size of the relative penetrator. **A design of the LOT shall be provided to the contractor.** The LOT was designed based on the following criteria:

- a. **GAS PIPING:** Chamber gas piping shall be configured as specified in Part C6. Air pressurization lines shall terminate with a muffler meeting the acoustical requirements specified in DM-39, to reduce noise in the chamber. All exhaust lines shall have anti-ingestion devices. Upon completion of testing, all chamber piping/penetrators shall be capped and sealed with a compatible blank fitting/flange, to prevent contamination of the systems.

1. Piping and Conduit contouring: Chamber gas piping and electrical conduit shall be contoured as closely as possible to the shape of the chamber. All gas piping and conduit shall be configured so that it cannot be used as a seat or a footrest and not to be located, whenever possible in operator areas.

b. DEPTH GAUGES:

1. Provide two pressure gauges externally mounted to monitor lock pressure. Each depth gauge shall have a dedicated penetrator. Bourdon type depth gauges shall have a minimum dial diameter of eight and one half inches and shall be calibrated in feet of sea water (fsw). The gauges shall have a maximum pressure of 50 fsw, and shall have an accuracy of one-quarter of one percent of full scale. The smallest graduations shall be 1 fsw with numerical indications at 10 fsw graduations. Gauges shall have mirrored reflection for ease of reading. One caisson gauge shall be provided for the interior of the chamber.

2. Provide two pressure gauges internally mounted, to monitor lock pressure. Each shall be a caisson gauge with an SIX dial calibrated in fsw. The gauge shall have a maximum pressure of approximated 50 fsw and shall have an accuracy of one-quarter of one percent of full scale. The smallest graduation shall be 1 fsw, with numerical indications at 10 fsw. The gauge shall be mounted so that it can be seen through the viewports by the supervisor. Snubbers shall not be installed. The gauge shall have a mirrored reflection for ease of reading.

c. LIGHTING: Normal and Emergency lighting shall be provided.

1. Normal: Lighting shall be provided from externally mounted light tubes meeting the requirements of NAVSEA Inst. 10560.2C. The LOT shall have three lights installed.

2. Emergency: Emergency lighting shall be provided for the LOT. Emergency lighting for the LOT shall consist of a battle lantern and required hardware, mounted at a viewport.

d. COMMUNICATIONS: Primary and emergency communications shall be provided.

1. Primary: Provide two channel page/talk-back communication system as primary communications. The system shall be powered by standard 110 VAC power during normal operations, and shall contain an integral battery power system for emergency use. A headset with boom microphone shall be provided for both the internal and external tenders. The headset shall plug into the speaker box, and cut off the speaker when the headset in use. The contractor shall provide headset cables for the interior headset(s) that allow the

inside attendant to be located at either end of the chamber with the headset on. The contractor shall provide the standard headset cable with the exterior chamber communications system. The contractor shall also provide an extension cable that can be "plugged" into the system, that will allow the chamber operator to open the outer lock door, or operate the medical lock. The system shall connect each lock and operating station.

2. Emergency: Provide a sound powered phone system for emergency communications, including a station at the interior and operating station, including the medical lock.
- e. BUILT-IN-BREATHING-SYSTEM: The contractor shall provide a built-in breathing system for the LOT, configured as specified in Part C6.
1. LOT BIBS: The LOT shall be provided with a manual type BIBS Control Panel. The panel shall be mounted on the chamber control panel, as shown in Part C6.
 3. SCUBA Regulators: The LOT shall be provided with nine (9) SCUBA second-stage regulator assembly complete with hose and connection valve, and dust cap. The interior BIBS manifold will run around the perimeter of the upper elliptical head of the chamber and will have connections for each SCUBA Regulator assembly. Each assembly shall meet the requirements of NAVSEA Inst. 10560.2C.
- f. VACUUM RELIEF VALVE: A vacuum relief valve as specified in part shown in section C6 shall be provided for the LOT. The vacuum relief shall provide enough flow to provide enough air to account for all drain operations. Calculations shall be presented in the Preliminary Design Submittal for verification.
- g. CONTROL PANELS: The LOT shall be provided with a Control Panel. The chamber controls, including pressurization, exhaust, communications, depth gauges, lighting, and BIBS, shall be mounted on a panel. Connections for all electrical components on the console shall be contained in a single electrical box meeting NEMA 4 requirements, and located as specified in Part C6. The panel shall conform to the requirements of Part C3. The Control Panel shall include a writing and Log keepers "writing table" area for writing and maintaining log books during chamber use. The panel shall be fabricated in accordance with contract paragraph 3.1.38, "panels", however the chamber control panel shall be painted light blue in color. All areas of the panel shall be accessible (bottom, sides, top, front (under table surface on console), where applicable, by removing the respective panel plate. Individual panel pieces of which the panel shall be installed with fasteners that allow easy removal. The framework for the panel shall be fabricated of non-corroding angle of no less than 1" sides by 1/4" thickness.

- h. **CHAMBER ELECTRICAL:** Required power is provided in an electrical box located near the location of the chamber. All piping internal to the chamber shall be no greater than 24 VDC. All piping located internal to the chamber shall be installed with rigid conduit. All wiring located internal and exterior to any chambers shall be waterproof and meet NEMA 4 requirements.
- i. **TEMPERATURE GAUGE:** The contractor shall provide a digital temperature gauge for the LOT. The gauge shall read in units of degrees Fahrenheit.

3.2.1.1 LOT FLOOD/DRAIN SYSTEM: The LOT shall be equipped with a flood/drain system. The interface of these systems with the JACDT is TBD during system design. The water to flood the LOT shall come directly from the JACDT pool's water column, **without** the use of a pump. The water drained from the LOT will be pumped back into the water column. The building contractor will install two double-sided standard ANSI/ASME six-inch flanges on the side of the pool, which will be used for the flood/drain systems. An emergency drain shall also be installed in the system, which shall consist of a quick acting ball valve.

3.2.1.2 INSTALLATION OF LOT: The installation of the LOT will require coordination with the building contractor. The LOT shall be completed before construction of the pool restricts or blocks the installation of the LOT.

3.2.2 AIR SYSTEM AND DIVER'S AIR STATIONS: The contractor shall provide for the Divers Air Stations System as configured in section C6. The piping shall meet the requirements of section C3. It shall provide for pressurization and breathing Gas for the LOT (as described above) and for the four (4) Diver Air Stations shall be located at each corner of the pool. Chase have been provide under the pool deck at each corner of the pool to facilitate installation of these stations.

3.2.2.1 HP Air Connection into Existing Air System: The diver's air system shall be equipped with an HP system. The air system will start at the Auxiliary Air Charging Panel, which is located in the Compressor Room as shown in section C6.

3.2.2.2 DIVER'S STATION'S COVERS: The contractor shall provide FOUR (4) Diver's Station Covers for each Diver's Station HP Panel. The cover shall be manufactured of Corrosion Resistant Stainless Steel. The cover shall be capable of protecting all components on the panel from the outside environment. The cover shall completely seal the interior components from the outside when shut by the use of seals, bulkhead unions, etc. The cover shall contain a door (or doors), provided with seals, and be capable of being opened so that it is clear from the operators area. The cover shall be capable of being locked in the "open" and "shut" positions. The cover shall be free standing and capable of withstanding the stresses of mounting the Diver's Station HP/LP Panel inside. The cover shall be labeled in accordance

with the paragraph "PANEL ID TAGS" and shall read "DIVER'S STATION (#)".

3.2.2.3 HIGH PRESSURE AIR STORAGE: High-pressure air storage shall be contractor furnished. The flasks shall be fabricated in accordance with ASME Section VIII, division I. Each of the two (2) flasks shall have a floodable volume of 36.1 cuft. Each flask shall be rated for 3300 psi. The pressure rating of the flasks must be compatible with ASME relief valve requirements. The contractor shall provide a means of mounting the flasks securely in the gas farm area as shown in Part C6, horizontally with a three degree slope towards the drain end. The low point end fitting shall provide an internal tube for water drainage. There shall be sufficient space around the flasks for external examinations, including ultrasonic thickness measurements.

3.2.2.4 MK-16 ROOM AIR CONNECTION: The contractor shall provide for an air connections on each Flask Panel as shown in section C6. These connections shall termination in a blank o-seal connection for future connection to the MK-16 classroom.

END OF SECTION

PART C4

4.1 GENERAL REQUIREMENTS:

- 4.1.1 ASME:** Pressure Vessels for Human Occupancy (PVHO) shall conform to the requirements of ASME/ANSI PVHO-1, "Safety Standard for Pressure Vessels for Human Occupancy" and ASME Section VIII, div 1, "Pressure Vessels". The PVHO shall be stamped. There are references to paragraphs in ASME Section VIII, div 2 in this specification. Those references are indicated by an exclamation mark following the paragraph number (Illustration, "Paragraph AG 301.1!").
- 4.1.2 NATIONAL BOARD REGISTRATION:** Each PVHO shall be registered with the National Board of Pressure Vessel Inspectors.
- 4.1.3 CHAMBER MATERIAL:** Plate material shall be SA-516, Gr70 or SA-537 type 1. All plate, unless otherwise specified, shall be 1/2" or thicker. Forging material shall be SA-182, type 304L (Hatch ring reinforcements, viewport forgings, etc.). Door material shall be SA-240, type 304L. Materials in table AQT-1 may not be used. All pipe shall be seamless stainless steel conforming to ASTM SA 312 Type 304L. All fittings shall be of seamless construction and shall conform to ASTM SA403 Type 304L. All bolted flanges shall be 304L stainless steel.
- 4.1.4 PROHIBITED DETAILS:** The following types of details shall not be used (paragraph AD 160!).
- a. Pad type reinforcements.
 - b. Fillet welded attachments (all attachment welds shall be full penetration welds).
 - c. Threaded connections.
 - d. Stud bolt attachments.
 - e. Partial penetration welds (all welds in and to the pressure boundary shall be full penetration welds).
 - f. Major thickness changes between adjacent plates.
 - g. Resistance welded studs.
- 4.1.5 HILLSIDE PENETRATORS:** Hillside penetrations may be used. The centerline of the penetrator shall be horizontal, vertical or at an angle of 45 degrees with the horizontal. The included angle between the centerline of the penetrator and a line that is perpendicular to the tangent at the point of penetration shall be less than 25 degrees.

- 4.1.6 PRODUCTION IMPACT TESTS:** Production impact test(s) of shell material base plate shall be conducted for all vessels for all thicknesses of vessel plate. The production impact test(s) shall test the base material, welds and heat affected zones in accordance with paragraph AT-203!. Should only one thickness of vessel plate be used (cylinder, hemispheres, etc.), the test coupon shall be attached to the termination point of the cylinder longitudinal weld.
- 4.1.7 CORROSION ALLOWANCE:** The design includes a corrosion allowance of not less than one-sixteenth of calculated required plate thickness.
- 4.1.8 TENSILE STRESSES:** Details are to be such that tensile stress shall not be applied to the short transverse direction of rolled plates.
- 4.1.9 ATTACHMENTS:** Attachments shall be of the same material and thickness as the pressure boundary. A request for exception to this requirement shall be submitted by the contractor and approved by the Government.
- 4.1.10 LUGS:** Lugs with bolt-holes shall be welded to the interior and exterior surfaces of each hull so that equipment grids can be bolted to the lugs. The lugs shall be located on a square grid. The distance between lugs shall not exceed 4 feet. Thirty-six lugs shall be provided on the exterior of the each PVHO. The preferred location of all lugs shall be provided by the contractor as a part of the Preliminary Design. All exceptions to the use of lugs must be approved by the Government.
- 4.1.11 ELECTRICAL/LIGHT PORT PENETRATOR REINFORCING:** Penetration reinforcing (electrical, light port) shall be forging or plate material in accordance with paragraph 20-220!, "Material". Reinforcing shall be integral design. Material shall SA240-304L or SA182-304L.
- 4.1.12 VESSEL STAMPINGS:** Welders', radiographic and/or other data except heat numbers shall not be stamped on the PVHO, a weld map and weld log shall be kept (paragraph AF235!).
- 4.1.13 VIEWPORTS:** Acrylic viewports shall be in accordance with ANSI/PVHO-1, "Safety Standards for Pressure Vessels for Human Occupancy". Each viewport lens shall be hydrostatically tested prior to assembly into the PVHO. The test pressure shall be one and one quarter times the design pressure of the PVHO. The test pressure shall be raised to maximum test pressure and held for 15 minutes. The test pressure shall then be reduced to design pressure and held for two hours; and, measurements shall be taken of the motion of the lens relative to the frame every 15 minutes. Flat plate viewports shall be tested from both sides. Viewports shall be capable of being installed with either face being exterior or interior.
- 4.1.14 VIEWPORT GASKETS:** Flat viewports shall have flat rubber gaskets. The bearing stress on the rubber shall not exceed 250 psi, including preloading. The coefficient of friction and the gasket

thickness at the bearing surface shall be suitable to prevent "extrusion" of the gasket.

4.1.15 STRUCTURAL SUPPORT: The structural support of the PVHO shall be of such a character to minimize the stresses induced into the PVHO as a result of diametrical and longitudinal straining of the PVHO.

4.1.16 PIPING ATTACHMENTS: A stress analysis shall be conducted on all piping attached to the PVHO (1/2" and larger). The stress analysis shall be made in the vicinity of the penetration. The analysis shall conform to the ASME Pressure Vessel Committee, Welding Research Council, Bulletin #107, "Local Stresses in Spherical, and Cylindrical Shells due to External Loadings", and ASME Section VIII, Div 2.

4.1.17 LUBRICANTS: Provision shall be made for lubrication of all running parts (doors etc). Lubrication zerco's shall be made of non corrosive 316 stainless steel. Lubricants shall be as specified on the drawings, and shall conform to the requirements of NAVSEA S9086-H7-STM-010 Naval Ships' Technical Manual Chapter 262, Lubricating Oils, Greases, Hydraulic Fluids, and Lubrication Systems, Section 7, Lubricants in Diving Systems.

4.1.18 PAINTING:

a. PVHO COLOR: The internal and external surfaces of each PVHO shall be painted a semi-gloss white.

b. SURFACE PREPARATION: All recompression chamber surfaces to be painted shall be sandblasted or mechanically centrifugally blasted to "white metal" in accordance with SSPC SP-5. Bare surfaces shall be cleaned by wire brushing or by other manual or mechanical means for removal of loose scale, rust dirt and other deleterious substances.

c. PAINT APPLICATION: The finish of the PVHO shall be as specified below. Finishes to be used on the surfaces of the PVHO shall conform to the following, and a painting plan (with surface preparation data) shall be submitted to the Government. After surface preparation, all surfaces, including personnel and service lock enclosures shall be painted with the following system:

<u>Number of Coats</u>	<u>Material</u>	<u>Apply by</u>	<u>Thickness Dry Mils</u>	<u>Total Dry Time</u>
1	Carboline 890 primer	spray	8	16 hrs
1	Carboline 890 finish white	spray	8	48-72 hrs
Total Dry film thickness:			16	

- d. PAINT CURE:** The contractor shall cure each coat by means of forced ventilation and heat in accordance with manufacturer's specifications. Curing time and conditions shall be recorded for each coat. Upon completion of the final cure and pressurization for leak testing, a gas sample shall be taken to verify that offgassing is complete.
- e. SURFACE INSPECTION:** After the prime coat has dried for the specified time, interior and exterior surfaces of the recompression chamber(s) shall be thoroughly checked for porosities. Porosities shall be marked and patched with primer. Phenoline 300 orange, with Special Mica filler, shall be used to patch porosities on metal surfaces. Putty knives or small trowels shall be used to push the material into voids and a brush dipped in Carboline Cleaner No. 2 shall be passed over the patches to smooth their surface.
- f. CHAMBER INTERIORS AND EXTERIORS:** Each coat shall be inspected during and immediately after application for wet film thickness, pinholes, runs, and sags. The film thickness shall conform to the specifications. Pinholes, runs, sags on the painted surfaces shall be repaired immediately while the paint is still wet, by removing the paint in the affected area and reapplying the coat. Pinholes which appear after the last coat has been applied must be filled properly. All paint work shall be subject to inspection at any time to ensure strict compliance with the specifications.
- g. SAFETY:** In all buildings and areas where painting, as called out in this specification is accomplished, the contractor shall take special precautions to see that proper ventilation is provided. Continuous forced-air circulation must be provided during coating application. In confined areas, workmen must wear air-line respirators with a source of low-pressure fresh air and precautions shall be taken to provide eye protection for the workmen when spraying overhead. No painting shall be done adjacent to any fire hazard such as welding or open flame.
- h. MS/DS SHEETS:** OSHA Material Safety Data Sheets shall be provided for the paint system to be utilized as well as all solvents or thinners used in the preparation of the surfaces or mixing of the paints.
- i. WORKMANSHIP:** All work shall be done by skilled painters in a manner to produce a smooth, workman-like finish, so that any final painted surface is free of sharp protrusions, pockets and pinholes. Where painting materials are applied incorrectly, the faulty paint shall be removed and the surface recoated.
- 4.1.19 CORRODIBLE SURFACES:** There shall be no corrodible surfaces on the exterior nor the interior of the PVHO. All surfaces shall be painted, stainless steel with a polished finish, or plated.

- 4.1.20 MACHINED SURFACES:** All machined surfaces shall be MT or PT examined (paragraph AF 110!).
- 4.1.21 SURFACES & EDGES:** Rough mill scale shall be removed from plate. Welds shall be dressed as appropriate to prevent any sharp or unsightly joints. Corners and edges shall be deburred, radiused or chamfered as specified in the contract drawings. Non-functional sharp edges or projecting points are not permitted.
- 4.1.22 WELD CONFIGURATION:** All butt welds in the pressure vessel shall be full penetration double V-groove welds in accordance with paragraph AF 221!. All corner welds in the pressure vessel shall be full penetration double bevel groove welds in accordance with paragraph AF 223!. All welds to and in the pressure vessel shall be full penetration welds. Other weld procedures, such as ceramic backed single V-groove welds, may be used upon review of the COTR.
- 4.1.23 NOZZLE WELDS, SPHERICAL SHELLS:** Nozzle welds with finished openings greater than 6" dia., in spherical shells, shall be type #1 butt welds in accordance with paragraph AF 221!. Penetration welds with finished openings smaller than 6" dia., in spherical shells, shall be full penetration corner welds in accordance with paragraph AF 223!.
- 4.1.24 NOZZLE WELDS, OTHER:** Nozzle welds, in shells other than spherical, shall be full penetration corner welds in accordance with paragraph AF 223! and paragraph AD-610!.
- 4.1.25 EXAMINATION OF WELDS:** Full penetration corner welds in accordance with paragraph AF-223! shall be UT examined after welding is completed. In addition to and after the requirements of AF 231!, "Preparation of Reverse Side of Double Welded joints" are met, the metal at the base of weld metal first deposited shall be examined by MT or PT on each side.
- 4.1.26 WELDING PROHIBITION:** No welding, hot work or other actions affecting the chamber shell shall be permitted after the PVHO has been ASME stamped.
- 4.1.27 WELD FINISH:** All welds shall be ground smooth prior to non-destructive examination.
- 4.1.28 WELD RECORDS:** The chamber weld records required shall consist of a chamber weldment joint identification drawing (JID) for each chamber, with all chamber joint welds shown and a joint identification number assigned to each weld and a chamber weldment recorded form for each welded joint including non pressure retaining joints. The weldment record shall include all lug-attachment welds. The weldment record form shall contain the following information:
- a. JID number.
 - b. Joint design type.
 - c. Base metal type with head and lot number.
 - d. Filler metal type with head and lot number.

- e. Fit up inspection results.
- f. Welding Procedure number.
- g. Heat treatment if required.
- h. Welder number.
- i. Type of inspection and results.
- j. Disposition of joint (pass/fail)
- k. Any repairs of joint conducted.
- l. Inspection procedure number.
- m. NDT inspection number.
- n. Signature and date.

Welders symbols shall not be stamped on the pressure vessel, a weld map in accordance with AF 235! shall be kept.

4.1.29 CHAMBER DOORS: Chamber door shall be fabricated of 304L grade stainless steel. Latches which hold the door in the open position shall be provided. They shall have bumpers so that the door does not slam against the hull or installed equipment. Latches shall be provided to hold the door shut and stable during shipping. The exterior side of each door shall have two handles made of round bar. The interior shall have one. In addition, a grab bar type handle shall be mounted on both sides of the heads above the door or other location as shown in section C6.

a. DOOR SEALS: Door seals shall be o-ring type with dovetail grooves machined into the door. All double bevel sealing surfaces shall be flat to within .003"; surface finish shall be equal or less than 32 rms or as otherwise specified. Refer to section C5 for details.

b. DOOR TYPE: Doors shall be of the "gantry" type (or other type as approved by the COTR). The "gantry" suspension arm shall be of "one piece" construction, as shown in Part C6. The gantry door hanger shall have a positive type locking device, such as a crown nut or cotter pin, to prevent the unintentional release of the door from the gantry. Markings shall be provided on all doors and the manway reinforcing rings to provide for proper alignment of the doors. These markings shall consist of a line of dots on both the door and ring.

4.1.30 HYDROSTATIC TESTING: The PVHO shall be subjected to hydrostatic strength meeting the requirements of ASME Section VIII. The tests shall be conducted with the PVHO in all possible pressure resistant configurations. The contractor shall submit a plan for each test. The plans shall include safety precautions to be used during testing.

4.1.31 LEAK TESTING: A gaseous leak test shall be conducted after the hydrostatic strength test. The test shall be conducted with air unless otherwise specified. The maximum test pressure shall be design pressure. The gas pressure shall be permitted to stabilize as a result of temperature change. Then, a bubble test meeting the requirements of ASME section VIII shall be performed.

- 4.1.32 COMPONENT GROUNDING:** All internal items in the chamber (bunks, table, etc.) shall be grounded.
- 4.1.33 HARDWARE MATERIAL:** All chamber hardware/internal fittings, including but not limited to bunks, tables, braces, chains, nuts, bolts, screws, etc., shall be fabricated of 304 grade stainless steel.
- 4.1.34 VIEWPORT COVERS:** Each viewport shall be covered with a clear plastic plexiglass cover. The cover shall be attached to the exterior viewport housing with velcro type fasteners.
- 4.1.35 USN PRESSURE TEST:** A pressure test, in accordance with the requirements of the US Navy Diving Manual, Appendix D, shall be conducted by the contractor for any PVHO that has been relocated. This test shall be conducted after installation, and as a part of the final functional test. The results of this test shall be submitted to the Government.
- 4.1.36 FABRICATION ATTACHMENTS:** All shop or field fit-up, assembly and handling fixtures welded to the vessels shall be removed; vessel surfaces shall be ground smooth. All fixture welds shall meet the requirements of the paragraph entitled "Prohibited Details". Where loads in excess of 6000 pounds are to be handled by attachments, an ultrasonic examination shall be made of the plate in the area of the attachment prior to assembly and the weld locations reported on the weld map.
- 4.1.37 EFFECTIVE CODE:** The drawings provided with this contract shall be produced in accordance with the most current edition of the ASME Boiler and Pressure Vessel Code and the most current edition of ASME PVHO-1a.
- 4.1.38 FABRICATION REQUIREMENTS:** Each PVHO shall conform to ASME Section VIII, Division 1, "Pressure Vessels", and PVHO-1 "Pressure Vessels for Human Occupancy". Figures are included in Part C6. They shall also conform to Part C4.1, "Pressure Vessels for Human Occupancy, General Requirements" except for those paragraphs that refer to div 2. Each PVHO shall be stamped in accordance with paragraph UG-115.
- 4.1.39 LIFTING LUGS:** Lifting lugs shall be included into each PVHO design:
- a. Stress Inducement: The lugs shall be lift-tested by subjecting the lifting point to 2.5 times the chamber's weight, for a minimum of 10 minutes. To do so, the chamber may be anchored, and the force measured by means of a load cell located between the lifting point and the lifting apparatus. Alternately, the chamber may be filled with a volume of water equal in weight to 1.5 times the chamber's weight, after which the chamber is suspended from the lifting point.
 - b. Inspection: After the stress inducement, all welds associated with and in the vicinity of the lifting lugs shall be inspected by means of dye-penetrant. Visual inspection for deformation of

these items and surrounding shell plate shall be conducted. Any detectable damage shall constitute a failure of the test.

- 4.1.40 IDENTIFICATION:** The chambers shall be identified in accordance with ASME, Section VIII, PVHO. The marking shall be applied to the chamber on an identification plate conforming to MIL-P-514, type I, style I, composition C, of type I, grade A, class I material. The plate(s) shall be attached to the PVHO by welding. Hollow-bolt penetrators shall be marked with manufacturer's abbreviation, National Board number and a sequential number.
- 4.1.41 PVHO PENETRATORS:** Pipe penetrations in the PVHO hull shall be bolted flange type penetrators, and shall be fabricated of 304L grade stainless steel. The external side of all penetrators shall be sealed with a blank flange during and shipping.
- 4.1.42 FLOOR PLATES:** Floor plates, each weighing not more than 25 pounds, shall be provided for the chamber interiors. If the span of a floor plate is such that the possibility of sag exists, a center support shall be provided. Floor plates shall be fabricated from non corrosive 304L grade stainless steel checker plate. Each floor plate shall be secured to the floor plate support by quarter turn release type fasteners, or other means acceptable to the Contracting Officer. "Finger" holes shall be provided on each end or each floor plate to assist personnel in lifting/removing the plates.
- 4.1.43 CHAMBER VIEWPORTS:** All chamber viewports shall have a clear viewing area of at least 8 inches.
- 4.1.44 CHAMBER CLEANING:** Recompression Chambers shall be clean upon delivery. They shall be cleaned with a non-ionic type detergent, and be free of extraneous debris.
- 4.2 SPECIFIC REQUIREMENTS:**
 - 4.2 SPECIFIC TO PROJECT, LOCK OUT TRAINER (LOT):**
 - 4.2.1 LOT:** The LOT, PVHO, shall be single lock, steel construction, as defined in the accompanying contract drawings. The LOT shall be constructed to a design package that will be provided to the contractor. A Finite Elemental Analysis and ASME Design Report will not be required as a part of the fabrication package.
 - 4.2.2 DEFINITION:** Lock Out Trainer (LOT), PVHO. The LOT is composed of the pressure vessel and its appurtenances.
 - 4.2.3 STRAIN GAUGE:** None
 - 4.2.4 ADDITIONAL BLANK PENETRATION:** One additional penetration in the 15-Foot Lock shall be provided. These penetrations shall be of the viewport type, except that the viewport shall be replaced by a blank penetration plate, constructed of 304L stainless steel. The

penetration shall be located in the inner lock. The location of the penetrator shall be provided by the Government.

- 4.2.5 CHAMBER OUTFITTING:** The LOT shall be outfitted internally with hangers for use in storage of each of the nine (9) SCUBA 2nd stage regulators, hoses and connections.
- 4.2.6 CHAMBER CLEANING:** Recompression Chambers shall be clean upon delivery. They shall be cleaned with a non-ionic type detergent, and be free of extraneous debris.
- 4.2.7 ATTACHMENT SKIRT:** The contractor shall provide the LOT with an attachment skirt as configured in section C6. The attachment skirt is used to connect the trainer to a water tower column via means of a connecting flange. The design of the flange that the LOT is to connect to will be provided by the Government upon request. The attachment flange shall be fabricated of SA 312 304L stainless steel. The attachment skirt shall be fabricated of the same material as the pressure hull.
- 4.2.8 GAS SAMPLE:** An ambient gas sample taken inside of the chamber shall be provided. This sample shall be taken after all welding, painting and testing has been completed, and the chamber is ready for delivery. The ambient sample shall analyze the entire interior of the chamber, and shall be taken after a 12-hour soak time at 15 fsw.

END OF SECTION

PART C5

5 QUALITY ASSURANCE

5.1 GENERAL REQUIREMENTS:

- 5.1.1 All work performed shall be in accordance with and to the standards and specifications cited in each section. Any changes in design or deviation from accepted standards must be documented and submitted to the Government prior to change or implementation.
- 5.1.2 **DESIGN REVIEW MEETINGS:** Design and fabrication review meetings shall be held by the contractor at the contractor's facility or the installation site, at time intervals no greater than six weeks. Two weeks advance written notice shall be furnished to the Government prior to each meeting.
- 5.1.3 **CONTRACT ADHERENCE:** The contractor shall rigidly adhere to the requirements for qualification, certification, test, examination and inspection required by the various contract documents.
- 5.1.4 **SUBCONTRACTORS:** Subcontractors shall be monitored by the contractor to assure timely and adequate performance and adherence to approved specifications. Copies of all certifications/qualifications required for the subcontractor to perform his work shall be submitted by the contractor to the Government.
- 5.1.5 **SUBMISSION NUMBER:** All submissions and submittals required by this contract shall include one (1) original and three (3) copies of the submission.
- 5.1.6 **DISK COPIES:** Systems manuals shall be prepared using a commercially available word processing program. All drawings shall be prepared on a commercially available computer aided design program. The component database shall be prepared on a commercially available spreadsheet design program. All submissions (Preliminary Design, Final Design, and As-Built) of systems manuals, drawings, and component database shall include CD copies of the system manuals, drawings, and component database formatted for MS-DOS (IBM compatible). Final disk submission of systems manuals, drawings, and component database shall be marked "As built". Final disk submissions of drawings shall include all the names of all signers present on the mylars, and the date of signature. Complete files must be in current NMCI computer program product format such as MS Word 2004, MS Excel 2004, AUTOCAD release 2006 (minimum), MS Access 2004 Professional. The contractor shall provide a minimum of two (2) copies of all CD's.
- 5.1.7 **NOTIFICATION OF TESTING:** The contractor shall provide the Government with written notification of all testing. This notification shall be received by the Government a minimum of fifteen working days prior to the date of the test.

- 5.1.8 CONTRACTOR'S RECORDS AND DOCUMENTS:** The contractor shall submit copies of all records and documents required by this contract and the codes and specifications cited herein. One original and three copies shall be submitted.
- 5.1.9 PIECEMEAL SUBMITTAL:** Piecemeal submittal of any submittals required by this specification is unacceptable, and such submittals will be returned without review.
- 5.1.10 QUALITY ASSURANCE PLAN:** The contractor's Quality Assurance Plan shall be in accordance with **ISO 9000** or **MIL-Q-9858**, and with any further quality requirements specified in the contract. As a minimum content, the program shall disclose the contractor's planned approach to fulfilling the requirements of every paragraph of sections 3 through 7 of MIL-Q-9858. A description of the organization that will fulfill the quality program requirements with a definition of the responsibility and authority of each functional element, shall be included. All of the contractor's documented policies or procedures which implement the quality program shall be identified in appropriate places with the plan. A short summary of the objective or purpose of each procedure shall be given. The plan must delineate, by flow chart or similar technique, where inspection, audit and other controls are to be applied to assure conformance with the contract quality requirements and must identify each assembly, process and inspection instructions applicable to the contract hardware and show where it is to be applied. The plan shall describe the method by which the plan will be applied to sub-contractors.
- 5.1.11 DESIGN PACKAGE:** Documents in this package shall be of sufficient detail to demonstrate that the contractor's plan for the work described in this contract is in conformance with this contract as well as demonstrating the technical and functional feasibility of the contractor's plan. All elements of the design shall be in strict conformance with the hyperbaric facility code requirements as stated in paragraph 1.2.8. It shall clearly indicate where equipment, components and piping runs are intended to be located. Pragmatic issues of installation and maintenance shall be addressed. During development of the preliminary design, the contractor is responsible for visiting the site to facilitate layout of work. Drawings shall be in accordance with DOD-STD-100. Drawings shall be 17" x 22", LEVEL 2 drawings. The Government will respond to the Preliminary Design submittal within 30 days of receipt. The preliminary package shall consist of the following applicable items, as a minimum.
- a. General Arrangement Drawings.
 - b. System piping and electrical schematics.
 - c. Calculations.
 - d. Proposed Material and Manufacturing Specifications and qualifications.
 - e. Preliminary Component Manufacturer's Design Data.
 - f. Subcontractors Identification, Qualifications, and Certifications.
 - g. Hyperbaric Systems Manual Outline.

- h. Component and Panel ID tags.
- i. Test Plans
- j. Welding Qualifications and Procedures
- k. Cleaning Qualifications and Procedures
- l. Painting Plan
- m. Non-destructive Testing Plan and Qualifications

5.1.12 not used

5.1.13 **DRAWING PACKAGE (NDSTC):** The drawing package shall be configured, and contain the elements, as described in NDSTC PD-2. A copy of PD-2 will be provided by NDSTC to the contractor upon request. As-Built Drawing numbers shall be assigned by NDSTC prior to submission of the As-Built Submittal, during redline markup period.

5.1.14 **RECORD DRAWINGS AND DOCUMENTATION:** RECORD DRAWINGS SHALL MEET THE REQUIREMENTS OF NDSTC PD-2

5.1.15 **COMPONENT MANUFACTURER'S DESIGN DATA:** The contractor shall provide the Component Manufacturer's Design Data (CMDD) for all components provided as part of this contract. The CMDD shall be provided in one completely marked and coordinated package sufficient to assure full compliance with the specification requirements. Submittals for each manufactured product shall include, but not be limited to the following: Manufacturer's descriptive literature and catalog cuts, manufacturer's operation and maintenance manual (**2 Copies**), equipment drawings, diagrams, performance and characteristic curves, catalog model or number, nameplate data, size, layout dimensions, capacity, specification reference, component tag number, and find number from valve and component list/drawings.

5.1.16 **SYSTEMS MANUAL:** The contractor shall provide Systems Manuals. The contractor is responsible for providing all sections for systems provided under this contract. The manual shall consist of the following:

- a. General Facility Description:
- b. System Certification:
- c. There shall be a section addressing each of the Hyperbaric Systems. The following data shall be provided by the Contractor for each system:
 - 1. System Operational Capabilities, Limitations and Set Points.
 - 2. System Narrative Description.
 - 3. System Piping and Electrical Schematics.
 - 4. System Operating Instructions.
 - 5. System Maintenance Instructions.
 - 6. System Design Computations.
 - 7. System Spare Parts Data.
 - 8. Component List.
 - 9. System Functional Test.

5.1.17 CONTRACTOR'S RECORDS AND DOCUMENTS: Contractors records and documents shall include all records and documents required by Part C1 and C3. These shall include, but are not limited to:

- a. Test reports
- b. Inspection reports
- c. Test plans
- d. Travelers/route sheets
- e. Mill certs/material reports
- f. Procedures
- g. Qualifications
- h. Records
- i. Working drawings
- j. Radiographs
- k. Shop Drawings

5.1.18 COMPONENT DATABASE: The Component Database provides design, procurement and manufacturer's data about the components. The database requirement shall be met by the use of MS Excel or MS Access. The database fields (columns) shall be:

- a. Component Identification Tag number.
- b. Design data:
 1. Type Component.
 2. Size.
 3. Drawing Number used on.
 4. Required Psi.
 5. Material Body and Seat
 6. End Connection Type and Material
- c. Manufacturer's Data:
 1. Manufacturer's name
 2. Manufacturer's address, telephone number.
 3. Model Number.
- d. Maintenance Data:
 1. Part number and price of consumables.
 2. Frequency of maintenance.
 3. Manufacturer's Recommended Spare Parts.

5.1.19 FUNCTIONAL TEST PLAN: The contractor shall submit a functional test plan for the complete test of all hardware provided as part of this specification. The functional test plan shall include valve line up, functional testing procedures, pass/fail criteria and shut down of the system being tested. There shall be initial blocks for all steps of the functional test plan. There shall be final signature blocks for both the contractor's completion and the Government's witnessing of successful functional test. The plan will provide information as to all equipment needed for testing and the calibration information for that equipment. The test plan shall contain, as a minimum, the following data:

- a. Test purpose/objectives.
- b. Identify each assembly to be tested.
- c. Describe test set up at each level of test, including diagrams and sketches to illustrate the test set-up.

- d. Describe or identify all test equipment required. Calibration of test equipment.
- e. Describe all test procedures, including test sequence, test parameters, participants, and pass/fail criteria.
- f. Provide sample test data sheets to illustrate test data to be documented and delivered at each level of test.
- g. Establish criteria for acceptance at each level of test and describe the procedures to be followed in the event of malfunction or failure.
- h. Identify critical or unusual tests or test conditions.
- i. Overall test schedule.

5.1.20 SYSTEM FUNCTIONAL TEST: The contractor shall be required to demonstrate by testing that all piping, instrumentation and systems are capable of meeting all the criteria contained in this specification. The functional test shall not be conducted until all other required testing has been completed, gas analysis reports have been received, and final, as built drawings have been submitted to the Government. The contractor shall prepare a test plan and a test report.

5.1.21 PROJECT SCHEDULE: The contractor shall prepare a contract progress schedule that clearly defines the tasks necessary to accomplish the work. The schedule shall be a GANTT chart, CPM chart or "ROADMAP". The schedule shall be composed of defined and documented Milestones and Tasks (M&T). Milestones are defined as having no time duration; whereas, Tasks have time duration. The schedule shall show the order and interdependence of M&T and the sequence of M&T execution necessary to complete the contract. The schedule shall show the M&T that comprise the critical path. It shall show the float for those M&T not on the critical path. Procurement and subcontracting tasks may cite total individual procurement or subcontract cost. Copies of M&T documents whose work was completed during a monthly period shall be submitted with the monthly progress report for that period. The M&T documents shall be signed by the contractor to indicate certified completion of the Task. The monthly update of the contract schedule shall contain the date of effect of that update and a list of the revision dates of the schedule. The following shall be included in the schedule as either milestones or tasks, as a minimum, in addition to others necessary to describe the work:

- a. Work Tasks.
- b. Contractual execution date requirements milestones.
- c. Government furnished information and/or equipment milestones.
- d. Contractual submittal date requirements milestones.
- e. Procurement activities including major equipment tasks.
- f. Subcontract activities tasks.
- g. Quality Control checks.

5.1.22 MONTHLY REPORT: The contractor shall provide a monthly report, which shall include an update of the Project Schedule and Component Database. The revised documents shall reflect any changes occurring since the last updating. It shall also include a current

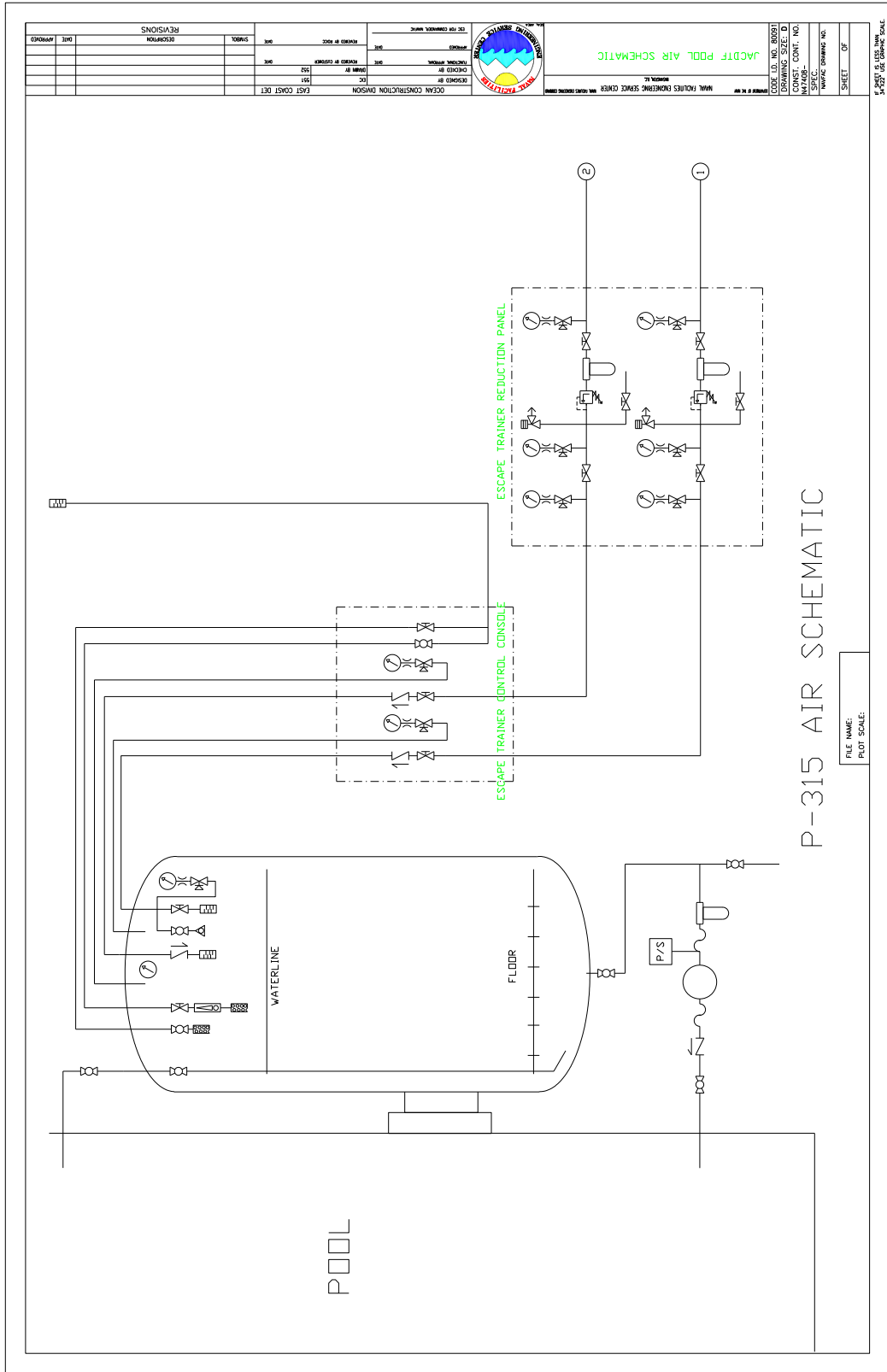
Progress Report containing a summary of all work performed and any problems and their solutions encountered during the reporting period, and a statement of the overall status of the project, and a statement of the overall status of the project. This report shall be sent electronically in its entirety to the COTR.

5.1.23 PURCHASE ORDERS: The contractor shall submit all purchase orders for all material purchased. The Contractor shall prepare a database or table which cross-references data such as purchase order number, find number (if applicable), and any other pertinent information such as heat numbers. The purchase orders shall be kept in a separate three-ring binder (or binders). Each purchase order (and its applicable data) shall be separated by its own individual tab.

5.1.24 FACILITY FUNCTIONAL TEST: The contractor shall be required to demonstrate by testing that all piping, instrumentation, machinery, and systems meet the following criteria:

- a. Are hazard free.
- b. Are in accordance with applicable Codes and Standards.

END OF SECTION



NO.	DATE	BY	REVISIONS

DESIGNED BY	
CHECKED BY	
DATE	
PROJECT NO.	
CLIENT	
LOCATION	
DESCRIPTION	

PROJECT NO.	
CLIENT	
LOCATION	
DESCRIPTION	



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 www.escapetrainer.com

CODE	
DATE	
BY	
CHECKED	
DATE	
PROJECT NO.	
CLIENT	
LOCATION	
DESCRIPTION	

P-315 AIR SCHEMATIC

FILE NAME:
 PLOT SCALE:

