**TECHNICAL SPECIFICATION for**
**PORTABLE SHIPYARD NITROGEN SYSTEM**

## LIST OF ENCLOSURES

**Figure 1: Typical PSA Nitrogen Generator Configuration and Calculations**
**Figure 2: Portable Shipyard Nitrogen System - General Schematic Overview**
**Figure 3: Portable Shipyard Nitrogen System - General Schematic Overview**
**Appendix A: Environmental Safety and Health Requirements for the Bremerton Naval Complex**

**SCOPE**. This specification reflects those characteristics that are essential to the minimum needs of the Government for a "Turn-Key" PORTABLE SHIPYARD NITROGEN SYSTEM ($PSN^2S$). This specification provides the performance standards for purchase of an electrically driven; air-cooled; portable air compressor and nitrogen generator with boosted high pressure nitrogen storage and bottle filling capability. The nitrogen generation system shall be a stand-alone, "Turn-Key" system that directly replaces existing 2 and 3 tank cryogenic storage systems (gas only delivery) with cylinder filling capability. All components for the nitrogen generation unit should be installed in a common stackable 8ft x 20ft insulated and climate controlled shipping container, designed to permit frequent relocation by crane, truck, and forklift. The components utilized for the design of this system are commercially available off the shelf (COTS) and should require only integration, assembly, operational verification and certification in final configuration to meet the contract specifications. The proposed layout of equipment in Figures 1-3 are based on average component sizing across industry. Innovative designs that improve system function, capacity, size, weight, or cost asre encouraged to be included by the offeror in response. All submissions will be evaluated. If more than one 8ft x 20ft shipping container (or a larger container) is necessary to assemble selected system components, all components should be organized into a minimal footprint allowing clearances for maintenance and operation in both a stacked or side-by-side containerized configuration, or otherwise protected from the industrial marine environment.

The nitrogen generator shall be designed for operation at sea-level altitude, in the weather exposed to sun, freezing rain, snow, sleet, high and low temperatures, high and low humidity, and other climactic extremes. The operating environment is marine waterfront; therefore, components and coatings must be selected for protection from this corrosive environment. The $PSN^2S$ capacity at the outlet of the shipping container shall be capable of delivering 100 standard cubic feet per minute (SCFM), periodically, at a minimum of 99.995% purity while meeting all requirements for production, handling, and delivery of Type 1, Grade A Nitrogen per commercial item description (CID) A-A-59155. Operational performance design of the Nitrogen Generator should target the General Industrial usage tier of CGA G10.1 Grade L.

Sizing of generator and bottle bank with active recovery should meet periodic demands of 100 SCFM for at least 40 minutes per drawdown period, up to 3 times consecutively, with a 2-hour recovery between each drawdown period (see Figure 1 calculations). A continuous minimum bank recovery rate of at least 13 SCFM is required. Type I (gaseous) nitrogen shall be manufactured by any process known not to introduce oil into the nitrogen. Water lubricated, hydrocarbon free, or dry-seal compressor (booster) shall be used for compressing nitrogen in accordance with CID A-A-59155. This contract includes setup, testing, startup assistance, training, and on-site technical support until stable operation is achieved. It is the Government's intent that a single (primary) contractor experienced in the production of pressure swing absorption (PSA) technology in the marine industrial environment be awarded this contract and be responsible for the accomplishment of all work, including 3rd party certifications detailed by this specification.

1.1.1 The nitrogen generator shall be a complete and operational system, delivered assembled, piped, wired, and tested. After delivery, the unit shall require only the connection of power, routing of condensate, and testing in accordance with this specification.

1.1.2 The Portable Shipyard Nitrogen System shall meet the general specification requirements listed below. Additional performance and detailed requirements for specific components are stated in separate sections that follow these system-level requirements.

1.1.3 The $PSN^2S$ shall be NRTL certified. The offeror will obtain and provide independent 3rd party Nationally Recognized Testing Laboratory (NRTL) certification listing for the assembled $PSN^2S$ unit and ensure $PSN^2S$ assembly is properly marked with NRTL certification marking.

1.1.4 From the PSN$^2$S unit, in its final configuration, following completion of all intrusive work, obtain high-pressure gas sample from CGA-680 external high pressure cross connect location using high-pressure sample collection device. Provide independent 3rd party accredited laboratory gas sample analysis meeting all specifications for Grade A Nitrogen per CID A-A-59155. Provide high-pressure gas sample collection device and three high-pressure sample containers to the Government.

1.1.5 Obtain, provide, and install an active industrial noise suppression system inside of the PSN$^2$S (zerosound or similar) if necessary to ensure ambient noise levels inside and outside of the containerized unit are <84db during normal operation. Aggressive noise mitigations may be required depending on component selection.

1.1.6 Provide calibration gas (GASCO 103L-159-10 or similar), calibration rig, and procedures to verify both in-situ (installed) O2 sensors can accurately measure a minimum purity of 99.995% that is calibrated to certified standards that have known valid relationships to nationally accepted industry standards.

1.1.7 The government shall be provided with the ability to perform a comprehensive line-by-line analysis of all source code associated with software based industrial control equipment. A copy of all documentation, source code, and proprietary drivers/firmware shall be delivered to the government electronically. All designs, drawings, source code, intellectual property, passwords, 2-factor authentication tokens, keys, locks, (etc.) associated with physical and digital equipment access in this procurement shall be delivered to the government. All documentation and coding shall be in English, using ladder logic to the maximum extent practicable. All code shall utilize industry standard formatting for tags and be verbosely commented/documented throughout. Code for PLCs and HMIs shall be provided as Studio 5000 Logix Designer Project File [version 17 through 35].

The PSN$^2$S system delivered shall match the approved IT hardware list in this document. Software based electronic components not already specified in this document (PLC component modules, routers, switches, etc) must be identified by Rockwell part number **in the initial bid response** for the government to complete the required IT purchase approval process. The operational technology (OT) solution provider selected by the offeror to provide the Studio 5000 compatible PLC/HMI solution may be able to provide this information. Changes in IT hardware beyond the initial approval may be evaluated on a case-by-case basis by the primary government point of contact, prior to delivery. Software and firmware versions may be tracked by the OT solution provider and provided at system turnover in the product documentation.

OT solution provider should develop Factory Acceptance Testing (FAT) program, Construction Acceptance Testing (CAT) program, Operational Acceptance Testing (OAT) program, and provide all objective quality evidence (OQE) of completion. The Software Quality Assurance (SQA) authority may provide the full OT/ICS integrated solution for the PSN$^2$S equipment package. Provide maintenance/regression testing device (SIMCase by InfoTech NorthStar <infotechnorthstar.com> or similar) for fully automated regression testing of the PSN$^2$S control system. The test device should be provided with procedures and training for troubleshooting the PSN$^2$S and simulations for training operators. The OT solution provider should have a strong understanding of the DOE/DOD software certification process in nuclear facilities. All software based systems that affect personnel or equipment safety should meet Safety Integrity Level 2 (SIL 2). Non-critical functions (ex: condensate treatment) should meet SIL 1.

The primarily ladder logic based Logix Designer Studio 5000 file(s) that will be used with the PSN$^2$S should be provided to the primary point of contact for the Shipyard for review a minimum of 14 days prior to equipment commissioning on-site. Once the PSN2S is on-site, the Shipyard will use the government provided laptop (Studio 5000 Application Code Manager) for compiling and uploading (or using the “compare” feature) to ensure logic in the PLC and HMI is satisfactory.

Alternate IT arrangements may be approved on a case-by-case basis by the primary Shipyard point of contact.

1.1.8 The government will provide and retain control of a laptop computer with Studio 5000 Application Code Manager with View Designer for use at the Shipyard. The use of industrial control hardware outside of the Studio 5000 suite (Allen Bradley/Rockwell Automation) may be

subject to additional approvals and could require full disclosure of compiler source code in addition to the product source code.

1.1.9 A substantial portion of the expense to the government of the first PSN$^2$S unit is the initial design, integration, development, NRTL certification, SQA, and on-site testing following commissioning. Each additional PSN$^2$S unit is expected to be produced at a significant cost savings to the government and partner entities, as subsequent units should require significantly less design and engineering resources.

Depending on the N+1 unit production cost, the government is currently tracking interest in obtaining an additional 27 PSN$^2$S units across multiple sites, pending the successful implementation and testing of the first unit. Prime contractor should ensure repeatable results, reproducible configurations, calibration and standardization procedures are developed, test equipment designs standardized, and repeatable results can be assured by the vendor in the production of additional PSN$^2$S units using the same NRTL and SQA certifications.

Upon satisfactory completion of testing, the offeror selected to design/engineer/produce/test the first PSN$^2$S may replicate or make available additional units of the PSN$^2$S to other US Government entities and Navy shipyards. This includes public and private Navy operations within the AUKUS trilateral security partnership for the Indo-Pacific region between Australia, the United Kingdom, and the United States. Contract language specific to the "Government" or "Puget Sound Naval Shipyard" or "Delivery Location" or "point of contact" can be substituted for the applicable contracting authority and location providing funding. Additional distribution of intellectual property, designs, or material developed under this agreement is subject to authorization by the initial contracting authority's representative.

2.0 **APPLICABLE DOCUMENTS**. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of an invitation for bids or a request for proposals shall apply.

2.1 **THE CODE OF FEDERAL REGULATIONS (CFR)**

2.1.1 29 CFR 1910 Occupational Safety and Health Standard

2.1.2 29 CFR 1926 Safety and Health Regulations for Construction

2.1.3 40 CFR 261 Identification and Listing of Hazardous Waste

(Application for copies should be addressed to Superintendent of Documents, Government Printing Office, Washington, DC 20402)

2.2 **NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

2.2.1 NFPA 70 National Electric Code

2.2.2 NFPA 79 Electrical Standards for Industrial Equipment

(Application for copies should be addressed to National Fire Protection Association, 470 Atlantic Ave., Boston, MA 02210)

2.3 **NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION (NEMA)**

2.3.1 ICS Industrial Controls and Systems

2.3.2 MGI Motors and Generators

2.3.3 250 Enclosures for Electrical Equipment

(Application for copies should be addressed to the National Electrical Manufacturers' Association, 2101 L Street, NW, Washington, DC 20037)

2.4 **AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)**

2.4.1 Z535.4 Product Safety Signs and Labels

2.4.2 S12.61-2020 Declaration and Verification of Noise Emission Values of Machinery

2.4.3 B16.5 Pipe Flanges and Flanged Fittings: one half inch through 24 inches

(Copy of ANSI Publications may be ordered from the website: http://www.ansi.org)

2.5 **AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)**

2.5.1 ASME - SECTION VIII - Unfired Pressure Vessel Code

2.5.2 ASME PTC 25 Pressure Relief Devices

(Application for copies should be addressed to ASME International, Three Park Avenue, M/S 10E, New York, NY, 10016-5990)

2.6 **AMERICAN WELDING SOCIETY (AWS)**

2.6.1 A3.0 Standard Welding Terms and Definitions

2.6.2 D1.1 Structural Welding Code - Steel

2.6.3 D1.2 Structural Welding Code – Aluminum

(Application for copies should be addressed to the American Welding Society, 550550 N.W. LeJeune Road, P.O. Box 351040, Miami, Florida 33135)

2.7 **WASHINGTON STATE ADMINISTRATION CODE (WAC)**

2.7.1 WAC-173-303 Washington Dangerous Waste Regulations

2.7.2 WAC-173-60 Maximum Environmental Noise Levels

2.7.3 WAC-173-304 Minimum Functional Standards for Solid Waste Handling

(Copies of these documents are available online at: https://apps.leg.wa.gov/wac/)

2.8 **INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)**

2.8.1 ISO 8573.1, 8573-1 Compressed Air – Part 1: Contaminants and Purity Classes

2.8.2 ISO Standards Handbook – Freight Containers (ISBN 92-67-10177-3)

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd St, New York, NY 10036)

2.9 **SOCIETY FOR PROTECTIVE COATINGS (SSPC).**

Society for Protective Coatings – Surface Preparation Standard 6 (SSPC-SP6) Commercial Blast Cleaning

(Applications for copies should be addressed to: Society for Protective Coatings, 40 24th Street 6th Floor, Pittsburgh, PA 15222-4656)

2.10 **PUGET SOUND NAVAL SHIPYARD**

2.10.1 P5100 (14) Handbook for Contractors and Visitors

2.10.2 P5100 (4) Contractor's Guide to Environmental Compliance

2.10.3 P5090 (5) Contractor's Guide to Hazardous Waste Compliance

(Request for copies should be addressed to Puget Sound Naval Shipyard & Intermediate Maintenance Facility, 1400 Farragut Avenue Bremerton, WA. 98314-5000)

2.11 **FEDERAL ACQUISITION REGULATION (FAR).** FAR Reissue 2023,

(Copy of this document is available online at https://www.acquisition.gov/browse/index/far)

2.12 **UNDERWRITERS LABRATORY (UL)**

2.13 **UL 94 Flammability Testing**

(Copy of this document is available online at http://www.ul.com)

2.14 **PROCUREMENT INTEGRATED ENTERPRISE ENVIRONMENT (PIEE)** – Receipt and Acceptance

(Additional information is available online at https://cac.piee.eb.mil/)

2.15 **COMMERCIAL ITEM DESCRIPTION (CID)**

2.15.1 A-A-59155 Nitrogen, High Purity, Special Purpose

2.15.2 A-A-59860 Valves, Cylinder, Gas

(Request for copies of Commercial Item Descriptions can be made at https://quicksearch.dla.mil/)

2.16 **COMPRESSED GAS ASSOCIATION (CGA)**

2.16.1 G-10.1 Commodity Specification for Nitrogen

2.16.2 P-8.1 Safe Installation and Operation of PSA […] Nitrogen Generators

2.16.3 V-9 CGA Standard for Compressed Gas Cylinder Valves

2.16.4 S-7 Method for Selecting Pressure Relief Devices for Compressed Gas Mixtures in Cylinders

2.16.5 S-1.1 Pressure Relief Device Standards Part 1 - Cylinders for Compressed Gases

2.17 **DEFENSE STANDARD (MIL-SPEC)**

2.17.1 MIL-STD-810H Department of Defense Test Method Standard

2.18 **DEFINITIONS AND ACRONYMS:**

2.18.1 **PSIG** (Pounds per Square Inch Gage). The pressure resulting from a force with magnitude of one pound-force applied to an area of one square inch as read on a gage.

2.18.2 **SCFM** (Standard Cubic Feet per Minute). The flow rate of a gas or air through a compressor at standard temperature and pressure conditions.

2.18.3 **PSN$^2$S** (Portable Shipyard Nitrogen System). Refers to the entire unit as a whole, which includes the low-pressure air compressor assembly, nitrogen generator, buffer tanks, process heater, nitrogen booster, and high-pressure bottle bank.

2.18.4 **PSA** (Pressure Swing Absorption). A technique used to separate some gas species from a mixture of gases (typically air) under pressure according to the species' molecular characteristics and affinity for an adsorbent material. It operates at near-ambient temperature and significantly differs from the cryogenic distillation commonly used to separate gases. Selective adsorbent materials are used as trapping material, preferentially adsorbing the target gas species at high pressure. The process then swings to low pressure to desorb the adsorbed gas.

2.18.5 **CID** (Commercial Item Description). A commercial item description is an indexed, simplified product description that describes by function or performance characteristics of available, acceptable commercial products that will satisfy the Government's needs.

2.18.6 **NIST** (National Institute of Standards and Technology). An agency of the United States Department of Commerce whose mission is to promote American innovation and industrial competitiveness. NIST's activities are organized into physical science laboratory programs that include nanoscale science and technology, engineering, information technology, neutron research, material measurement, and physical measurement.

2.18.7 **ISBN** (International Standard Book Number). A numeric commercial book identifier that is intended to be unique. Publishers purchase or receive ISBNs from an affiliate of the International ISBN Agency. An ISBN is assigned to each separate edition and variation of a publication. For example, an e-book, a paperback and a hardcover edition of the same book will each have a different ISBN.

**IIoT** (Industrial Internet of Things). Refers to the extension and use of the internet of things (**IoT**) in industrial sectors and applications with a strong focus on machine-to-machine (**M2M**) communication, data acquisition, and machine learning. What makes it distinct is the intersection of information technology (**IT**) and operational technology (**OT**). OT refers to the networking of operational processes and industrial control systems (**ICS**s), including human machine interfaces

(**HMI**s), supervisory control and data acquisition (**SCADA**) systems, distributed control systems (**DCS**s), and programmable logic controllers (**PLC**s). A user interface (**UI**) is the space where interactions between humans and machines occur. The user experience (**UX**) is how a user interacts with and experiences a product, system or service. It includes a person's perceptions of utility, ease of use, and efficiency.

**Terminology**

2.18.7.1 **Shall (will, must) -** Indicates that the requirement is mandatory. It is used wherever the criterion for conformance to specific obligations allows no deviation without specific consent of the contracting authority.

2.18.7.2 **Should** – Indicates that a specification is recommended. Consideration will be given to the extent that an offerors design meets the recommended design criteria. Any offeror that does not specifically exclude a recommended feature is committing to provide the recommended feature at contract acceptance.

2.18.7.3 **May (can) -** Indicates that the requirement is optional, possible, or allowable.

3.0 **REQUIREMENTS**

3.1.1 **GENERAL DESCRIPTION OF SYSTEM**. This specification covers the minimum Government requirements for a "Turn-Key" Portable Shipyard Nitrogen System.

3.1.2 The Portable Shipyard Nitrogen System shall be designed in accordance with applicable documents in Section 2.0

3.1.3 The nitrogen supplied by the nitrogen generator shall meet the following standards measured at the system outlet of the assembly:

3.1.3.1 Pressure: 350 psig +/- 15 psig

3.1.3.2 Flow: up to 100 SCFM for 40 minutes per drawdown, repeated up to 3 times daily, with a 2-hour recovery period between each drawdown. Minimum continuous bank recovery rate of 13 SCFM.

3.1.3.3 Stabilized Output Pressure Fluctuation: +/- 25 psi

3.1.3.4 Purity: 99.995% pure [purity trip point; may include trace quantities of neon, helium, and argon]

3.1.3.5 Oxygen: 10 ppm [Normal operation should target Type I QVL grade L of CGA G-10.1]

3.1.3.6 Total Water (dew point): -63.5 degrees Fahrenheit or 26.3 ppm water vapor (0.02mg/L) [Normal operation should target Type I QVL grade L: -89F or 4 ppm water vapor]

3.1.3.7 Hydrocarbon Content: <50 ppm as Methane by Volume

3.1.3.8 Odor: None Detectable

3.1.3.9 Leakage (gaseous nitrogen): None

3.1.3.10 Particulates: ≤ 50 microns (10-micron or better prior to bottle filling)

3.2 **CONTRACTOR RESPONSIBILITIES**. The Contractor shall be responsible for the following:

3.2.1 Provide design drawing(s) for the Portable Shipyard Nitrogen System (see paragraph 3.7.7-3.7.10).

3.2.2 Furnish labor and material handling equipment for off-loading and placing items.

3.2.3 Design, manufacture, test and groom all equipment required, providing a complete system as specified herein.

3.2.4 Assemble and test nitrogen generator as described in this specification.

3.2.5 Provide and charge all systems with fluids and gases in accordance with manufacturer's instructions.

3.2.6 Provide all necessary materials, tools, gages and instrumentation necessary to perform the required maintenance and tests. This equipment shall include an air exhaust silencer / muffler to reduce air exhaust noise during testing to a level below 104 dB (A scale).

3.2.7 Perform the operational testing and grooming of the system, in accordance with the requirements specified herein.

3.2.8 Provide complete documentation and organization of all technical data that applies to the installation, operation, maintenance, repair and testing of the specific equipment.

3.3 **GOVERNMENT RESPONSIBILITIES**. The Government will provide an area for the testing of the proposed equipment.

3.3.1 The Government will provide temporary electric service to support testing.

3.3.2 The Government will provide a source of shipyard air to connect to the Portable Shipyard Nitrogen System bypass for testing the backup operation mode (Shipyard supplied low-pressure air) for acceptance at destination.

3.4 **GENERAL REQUIREMENTS**

3.4.1 **Response to Request**. As a part of the response to this request, descriptive literature shall be furnished in sufficient detail to show that the proposed design will meet these specifications. Vendor submittals shall include brochures of the model being submitted, assembly sketches with critical dimensions, sketches (with dimensions) of all tooling provided, statements of compliance or exceptions to the specification, and performance statements with special attention to the key performance criteria stated herein.

3.4.2 **Standard, off the Shelf Components**. All materials and parts shall be new, of current design and manufacture, and shall not have been in prior service except as required for factory testing.

3.4.2.1 Standard, off-the-shelf components with proven reliability shall be used wherever possible to increase performance, reliability, reduce initial costs, and ensure availability of replacement parts.

3.4.2.2 The equipment shall be one of the manufacturer’s current production models which, on the day this solicitation is issued, has been designed, engineered and sold, or is being offered for sale through advertisements or manufacturer’s published catalogs or brochures.

3.4.2.3 Products such as a prototype unit, pre-production model, or experimental unit DO NOT qualify as meeting this requirement.

3.4.2.4 The equipment shall be complete, so that when connected to the utilities identified herein, it can be used for the function for which it is designed and constructed.

3.4.3 **Material Lockout and Tag out Program**. Energy Control (Lockout/Tags-plus). After contract award, the contractor shall meet with the Receiving Activity Point of Contact (POC) to discuss Lockout/Tags-plus interface prior to site work. The Government will provide the contractor with a copy of the Energy Control Program (Vol. II Chapter 9) lockout and tag out controls (Lockout/Tags-plus) used by the Government facility where the equipment is to be installed. The contractor shall use the Receiving Activity’s Lockout/Tags-plus procedures and comply with 29 CFR 1915.89. Lockout/Tags-plus procedures IAW 29 CFR 1915.89 shall be followed where applicable. Contractors shall train their employees to the Energy Control Program (Vol. II Chapter 9) of the Receiving Activity’s Occupational Safety and Health (OSH) Manual, or as otherwise directed by the Receiving Activity. Audits, surveillances, and incident investigations may be performed by the Government per 29 CFR 1915.89 and the Receiving Activity’s OSH Manual Vol. II Chapter 9 requirements

3.4.4 **Contractor Set-Up and Testing**. The nitrogen generator and all associated equipment shall be assembled, set-up and tested by the contractor in the area(s) designated as the test area by the receiving activity. The Contractor shall provide all personnel, equipment, and supplies necessary for the complete set-up and testing of the nitrogen generator.

3.4.5 **Coordination**. At award of contract, the contractor shall provide a designated Point of Contact to the PSNS & IMF contract representative.

3.4.5.1 The Contractor shall submit a proposed testing schedule to the PSNS & IMF contract representative a minimum of 14 days prior to arrival on-site for PSNS & IMF review and approval.

3.4.5.2 Approval of testing schedule shall not relieve the Contractor of any responsibility for performance in accordance with the contract.

3.4.6 **Disruption.** The Contractor shall coordinate the delivery and testing of equipment in a manner which causes minimum disruption/interference with the Shipyard's normal business routine.

3.4.7 **Work Process**. The Contractor shall provide a full time (start of set-up to acceptance of the equipment) field supervisor to direct set-up and testing.

3.4.7.1 The field supervisor shall have full authority to implement his field decisions in an expeditious manner.

3.4.7.2 No work shall be accomplished when the field supervisor is not in the immediate work area.

3.4.8 **Methods and Schedules**. The work shall be executed in a manner and at such times as to cause the least practicable disturbance to the occupants of the buildings and normal activities of the Shipyard.

3.4.9 **Personnel Safety and Health Requirements**. All machine parts, components, mechanisms, and assemblies furnished on the unit shall comply with all specific requirements of "OSHA Safety and Health Standard (29CFR1910), General Industry" that are applicable to the equipment itself. Covers, platforms, guardrails, belt guards, and safety devices shall be provided for all parts of the equipment that present a safety hazard. The safety devices shall not interfere with the operation or maintenance of the equipment. The safety devices shall be removable to facilitate inspection, maintenance, and repair of the part. Additional safety and health requirements shall be as specified in other paragraphs of this specification.

3.4.10 **Access Ladders, Platforms and Safety Rails**. For all equipment that requires preventive maintenance and servicing, provide access ladders, platforms, safety rails with toeboards and devices as required to meet 29 CFR 1910 Subpart D to allow workers to perform the maintenance without the use of personal fall protection.

3.4.11 **Energy Isolating Devices**. The equipment shall be provided with energy isolating devices (e.g., power switches, safety switches, circuit breakers, valves, etc.) that protect personnel from the release of hazardous energy.

3.4.11.1 The devices shall be designed and manufactured such that they can be padlocked in the user-selected position (ON or OFF, OPEN or CLOSED) to prevent inadvertent or unauthorized change.

3.4.11.2 All energy isolating devices installed or modified shall be capable of being locked by being integral to the equipment installed. This includes both mechanical and electrical devices.

3.4.11.3 Panelboards: At panelboards, all circuit breakers within the panelboard shall be installed with a "padlock handle attachment" device which is integral to the panelboard in order to comply with 29 CFR 1910.147.

3.4.12 **NRTL/OSHA Approved Certification** – The equipment installation and its component parts shall comply with the applicable OSHA regulations in accordance with CFR Title 29, Chapter XVII, Part 1910 and installed in accordance with NEC/NFPA requirements. Register and obtain certification of the completed PSN2S assembly with a Nationally Recognized Testing Laboratory (NRTL per 1910.7) for independent 3rd party OSHA compliance certification. Approval shall be as specified under the "Approval" and "Acceptance" criteria in the OSHA regulations Subpart "O", Machinery and Machine Guarding paragraph 1910.212 and Subpart "S" Electrical, paragraph 1910.303 and paragraph 1910.399. After equipment delivery and installation, and prior to testing, the contractor shall provide an OSHA Certification Report. Failure to provide this certification report will delay acceptance of the equipment, and could result in rejection for failure to comply with the terms of the contract.

This report documents the results of all tests performed, provides an assessment of the equipment performance for compliance with the contract requirements, and forms a basis for recommending a safety certification. The report, test, and evaluation shall be a composite of those inspection requirements specified in the contract. The report shall be prepared in an orderly manner to clearly and accurately set forth the collected data and conclusion resulting from these inspection requirements, opinions and subjective conclusions shall be clearly identified. The report shall include, but is not limited to, the following:

3.4.12.1.1 List of all tests performed and by whom witnessed

3.4.12.1.2 List of data used for evaluation

3.4.12.1.3 Tabulation of all discrepancies related to specification performance requirements

3.4.12.1.4 Description of limitations revealed by data utilized

3.4.12.1.5 Actions taken to mitigate each discrepancy and limitation.

3.4.12.1.6 Recommendations for subsequent actions

3.4.12.1.7 Summary conclusions.

3.4.12.1.8 Manufacturer provide Certification that equipment has been manufactured and installed to OSHA CFR 1910.399 (per definition of 'acceptable').

3.4.12.1.9 After certifying the $PSN^2S$ assembly under the NRTL program, apply a registered certification mark prominently to the $PSN^2S$ assembly.

3.4.13 **Calibration** - The contractor shall calibrate all Precision Measuring Devices using equipment certified and traceable to the National Institute of Standards and Technology. Contractor shall submit calibration certification to the PSNS & IMF contract representative within 30 days after arrival on-site for PSNS & IMF review and approval.

3.4.14 **Setup and Testing Support Services Provided by the Government**. The Shipyard will provide the following in support of the setup and testing:

3.4.15 **Receiving Activity Point of Contact**. Upon contract award, the receiving activity (Puget Sound Naval Shipyard) shall designate a Point of Contact who shall be responsible for appropriate surveillance and coordination of all services to be performed under this contract. The receiving activity Point of Contact shall serve as the Contractor's primary contact for all interaction with other Shipyard and Government activities.

3.4.16 **Utilities**. Reasonable amounts of shop air (~100 psi) and electricity will be made available adjacent to the assembly site at no cost to the contractor. The Contractor shall be responsible for any costs incurred in connecting, converting and transferring the utilities to the work.

3.4.17 **Lifting And Rigger Services**. The contractor shall provide all material handling and lifting equipment, rigging support services, and other support equipment (such as cranes, forklifts, Bobcats, man-lifts, etc.) necessary for continuous support of the set-up of equipment and shall provide qualified personnel to operate it.

> **Note:** The use of privately owned cranes by contractor personnel at the installation site is restricted. Contractors requiring cranes in the performance of this contract shall provide the PSNS & IMF contract representative with crane certification for review and approval. This information shall be provided to the Government at least ten (10) business days in advance of arrival of privately owned cranes.

3.4.18 **Storage**. Lay-down area will be provided within the vicinity of test site for storage of Contractor materials and tools.

3.4.18.1 The Government does not accept responsibility for security of Contractor's materials or tools.

3.4.18.2 The area must be kept clean and orderly, free of rags, paper and other debris. Failure to maintain area in a clean condition may result in the loss of the area.

3.4.18.3 The Contractor shall be responsible to restore the storage area to original condition after use.

3.4.19 **Bearings**. The contractor shall provide a list of exact U.S. or Canadian made equivalent bearings that can be used for replacement of each bearing within this equipment or system.

3.4.20 **Contractor Hazardous Waste Training**. Contractors that anticipate generating or encountering hazardous waste during the performance of the work specified herein shall attend Site Specific Hazardous Waste Accumulation Area Accumulation Operator Training for Contractors (Course 49HW). This training is provided free of charge. This training is held at PSNS & IMF Bremerton Site and is approximately three (3) hours in length. Contractors require access badges to attend the training. Contractors shall provide a list of names to the Government Point of Contact of those who will be attending the training. The Government Point of Contact will coordinate this training with the Shipyard Environmental, Safety and Health Office, Code 106.33.

3.4.21 **Audible Noise Levels**. The peak audible noise emitted by the total system, to include the equipment itself and any auxiliary or support equipment required and considered part of the system, shall not exceed **84** decibels at the operators work position, nor at any other point at a distance of three feet from the operator's position, as measured on the "A-weighted" scale of a type one sound level meter under all operating and service conditions.

3.4.22 **Low Noise Emission Products**. It is the Government's intent that products being offered be Low-Noise-Emission Products. Certified Low Noise Emission Products are products that emit noise in amounts significantly below the levels specified in federal and industrial noise emission standards and have been identified and certified per 42 USC Chapter 65.

3.4.22.1 Certified Low-Noise-Emission Products shall be provided over other like products for Government procurement and use.

3.4.22.2 Contractors shall identify any product being offered that is certified as a low-noise-emission product per 42 USC 4907.

3.4.22.3 Proof of noise level certification shall be provided upon request.

3.4.23 **Painting**. All surfaces shall be painted or galvanized in conformance with the manufacturer's standard practices and good workmanship. Painting shall result in a highly wear-resistant finish that guarantees continued protection to the surfaces covered against the specified environment under all service conditions. The manufacturer's standard color shall be provided unless otherwise stated.

3.4.24 **Lead based or chromium based paints are prohibited**

3.4.25 **Identification Plate**. Corrosion resistant identification plates shall be furnished with the equipment. A nameplate shall be affixed to each major component of the system showing the manufacturers name, equipment model, year of manufacture, contract number and any other pertinent information for identifying the part as a unique component of the system.

3.4.26 **Emergency Stop Buttons**. The equipment specified herein shall be provided with emergency stop buttons. These stop buttons shall be the mushroom type, shall be colored red, and shall be labeled as such. When activated, the emergency stop buttons shall disconnect all electrical power to the equipment such that all operations or functions shall immediately stop or cease and sound a local alarm.

3.4.27 **Controls and Instrumentation**. Operator controls, instrumentation and indicators shall be mounted convenient to operating personnel. Such devices shall be clearly and legibly marked for function and identification. Controls shall be fitted with suitable handles, pushbuttons, or control knobs, as applicable. Gauges and instruments shall be designed for recalibration. Pressure gauges shall be calibrated in the U.S. system of measurement.

3.4.28 **Lifting Attachments**. The allowable bending strength shall be based upon 1/3 of the allowable yield strength or 1/5 of the allowable ultimate strength, whichever is the most conservative, of the lifting attachment material.

3.4.28.1 The bearing strength shall be based upon 1/5 of 150% of the ultimate strength of the lifting attachment material.

3.4.28.2 The lifting attachments shall be sized based on the actual weights plus 10% for unexpected growth in the weight of the load. The resulting value shall be further increased to reflect the loads induced by the angle the slings make to the plane the lifting attachments lie on. The attachments shall be oriented so the slings shall not pull out of the plane of the individual lifting attachment by more than 5º unless they are designed to withstand the resulting side load. In addition, the individual loads for each point shall be calculated based on the configuration of

the rigged equipment and the location of its center of gravity. These final values shall be referred to as the Working Load Limit (WLL).

3.4.28.3 The structure supporting the lifting attachments shall be designed to sustain the various lateral loads imparted by the arrangement of the lifting attachments and the induced sling angle loads based on a buckling analysis per AISC, Allowable Stress Design.

3.4.28.4 For design purposes, only two diagonally opposed lift points shall be considered to support the weight of the equipment, regardless of the total number of lift points used.

3.4.28.5 Vertical Design Load shall be taken as the base equipment weight plus 10%. The base equipment weight is what the assembled item weighs, as delivered, plus the maximum possible weight of all fluids or material that the item is capable of containing when used as designed. The 10% is to account for any future modifications, changes, or additions to the equipment which would increase the weight.

3.4.28.6 Orientation of lift points shall be such that when loaded, the direction of lifting load will be in the plane of the padeye plate +/-5°. Location of lift points shall be symmetrical with respect to the equipment center of gravity (CG). Lift points shall also be in a common horizontal plane above the CG. Location of lift points shall consider that each leg of lifting gear will be of equal length. The equipment shall lift level within 3°. If the equipment is intended to be stackable, provisions in the design shall be made to prevent damage to the lift points of the lower item if the upper item is not landed accurately or symmetrically. When lift points are installed on the supporting structure by welds that carry the lifted load, welding shall be performed and visually inspected in accordance with American Welding Society (AWS) D1.1.

3.4.28.6.1 Allowable stresses for the lift points shall be based on the following:

YS = Yield Strength (minimum)

UTS = Ultimate Tensile Strength (minimum)

$F_{ALL} = MINIMUM\left[\frac{YS}{3} OR \frac{UTS}{5}\right]$ (Allowable bending/tensile stress. Use the minimum value.)

$\tau_{ALL} = \frac{F_{ALL}}{\sqrt{3}}$ (Allowable shear stress)

3.4.28.7 $\sigma_{BEARING} = 1.5 * \frac{UTS}{5}$ (Allowable bearing stress. Based on projected area of shackle pin.)

3.4.28.8 The lifting attachments are required to withstand a load test of 200% +5%-0% of the working load limit (WLL) and held under load for 2 minutes. Acceptance criteria shall be: No bending, cracking, or permanent deformation of the lifting attachments or associated structure. The contractor's certified representative will perform the load test and inspection requirements AWS D1.1 and submit documentation of the satisfactory results of all the various tests. The lifting attachments shall be labeled with the WLL and the test date.

3.4.28.9 The individual loads for each lift point shall be calculated based on the configuration of the equipment and the location of its center of gravity.

3.4.28.10 The fabricator shall mark the lift points in a permanent manner with the WLL, test date, and test load applied.

3.4.28.11 Lifting labels shall be mechanically fastened to rigid structure using stainless steel threaded fasteners and shall be constructed of photosensitive aluminum, or engraved stainless steel. Engraving shall be to a minimum depth of 0.2 mm, filled with black paint. The minimum label plate thickness shall be 0.5 mm.

3.4.28.12 All calculations required for the design of the lift points shall be performed by a Professional Engineer, and shall be provided for review at the time of the submittal of the equipment design.

3.4.28.13 Calculations supporting the lift point design shall be submitted to the Contract Representative for review by PSNS Lifting and Handling Group (Code 711.11) prior to delivery of the equipment.

3.4.29 **[Line Deleted]**

3.4.30 **Environmental Protection**. The unit shall be designed and constructed so that during operation, service, transportation and storage conditions described herein, including final disposal, the equipment will comply with all applicable Environmental Protection Agency (EPA) and Occupational Safety and Health Agency (OSHA) and State of Washington Department of Ecology (WDOE) restrictions for materials classified as hazardous to the environment in effect on the date of the contract. The equipment described herein shall not contain or emit material hazardous to the environment as prescribed by federal, state, and local statutes in effect at the date of installation.

3.4.31 **Hazardous Material Exclusions**. Supplies being used in the performance of this contract, or materials being provided as part of the equipment shall be free of known hazardous materials. Hazardous materials shall not be brought on site without prior approval of the Contracting Officer. Hazardous materials not needed for this project is prohibited. Definitions of hazardous materials are specified in the latest version, including revisions adopted during the term of the contract, of Federal Standard No. 313.

3.4.31.1 Notwithstanding any other hazardous material usage permitted in this contract, radioactive materials or instruments capable of producing ionizing radiation as well as materials which contain asbestos, mercury, cadmium, lithium, methylene chloride, lead (=or>0.06%), or polychlorinated biphenyls (PCB's) are prohibited.

3.4.31.2 Class I Ozone Depleting Substances as defined in 40 CFR Part 82 shall not be used in the performance of this contract, or be provided as part of the equipment. Additionally Class II Ozone Depleting Substances shall not be used in the performance of this contract, or be provided as part of the equipment due to its phase-out beginning in 2010.

3.4.31.3 Exceptions to the prohibition of these materials must be referred to the Contracting Officer in writing, for consideration prior to contract award.

3.4.32 **Safety Data Sheets (SDS)**. In accordance with FAR 23.3, offerors and contractors are required to submit Safety Data Sheets (SDS's) whenever supplies being acquired or supplies used during performance are identified as hazardous materials. Hazardous materials shall include any material which, by virtue of its potentially dangerous nature (e.g., toxic, flammable, corrosive, oxidizing, irritating, sensitizing, reactive), requires controls in its use, packaging, handling, storage, or stowage, to assure adequate safety to life and property. This definition is intended to apply to proprietary industrial, commercial, or locally prepared blends, mixtures, formulations, or compounds of gases, liquids, and solids intended for use at the job site. Any other material that has been designated by a Government technical representative as potentially hazardous and requiring safety controls shall also be supplied with a SDS. SDS's are to be available at work sites where materials are being used.

3.4.33 **Safety Signs and Labels**. Safety signs and labels in accordance with ANSI Z535.4 shall be securely attached to the equipment in visible locations, with any safety precautions to be observed by the operator or maintenance personnel permanently marked on the signs.

3.4.34 **New Developments**. If, during the contract period, any new developments are generated that would improve the efficiency, accuracy or productivity of the machine and its related equipment or would decrease its operation costs, the contractor shall immediately notify the Contracting Officer, in order that the new developments may, at the Government's option, be included in the equipment being purchased herein. All reports of such developments shall be addressed to the Contracting Officer.

3.5 **GENERAL EQUIPMENT REQUIREMENTS**. The following service and operational conditions shall apply to the equipment delivered under this specification.

3.5.1 **Equipment Usage**. The proposed system will be operated in a heavy-duty industrial environment and shall be capable of continuous operation over an extended period of time (24 hrs/day for 180 consecutive days) with minimal maintenance and upkeep.

3.5.2 **Environmental Conditions**. The unit shall be designed to operate in a salt and dust laden outdoor marine industrial environment, subject to wind driven rain, sleet and snow.

3.5.2.1 Temperature Range: 10 degrees F to 105 degrees F

3.5.2.2 Relative Humidity: up to 100% Non-Condensing

3.5.3 **Electrical**. The Portable Shipyard Nitrogen System shall utilize 480VAC, 60Hz, 3-phase power, with a maximum required electrical service of 200 amps. Other voltages, if needed, shall be provided using

transformers incorporated into the PSN$^2$S container(s). The power leads shall connect directly to the PSN$^2$S connectors model E1016, mfg CROUSE-HINDS or equal as evidenced by supportive documentation.

3.5.3.1 **Note**: The industrial power supplied to the unit is supplied by an electrical distribution system which also supplies nearby welding machines, variable speed drives, and other industrial equipment which cause transient variations in supplied voltage. The PSN$^2$S shall be designed to tolerate typical industrial power transients. This may require the inclusion of power conditioning equipment such as a transient voltage surge suppressor, reactor, or other component(s).

3.5.3.2 As part of the bid for this contract, the bidder shall provide a calculation of the peak electrical load (AMPS) to support a fully configured and operational Portable Shipyard Nitrogen System including all accessories in its fully configured and operational state.

3.5.3.3 All electrical components including motors, starters, relays, switches, wiring and their installation, shall conform to, NFPA, NEMA, and ANSI standards for the intended application and be listed by Underwriter's Laboratories (UL) or equivalent OSHA-recognized organization.

3.5.3.4 **Motors**. Motors shall be rated for continuous duty. Motors shall be equipped with ball bearings of the sealed and permanently lubricated type. Be 'PREMIUM EFFICIENCY ELECTRIC MOTORS'. All electrical motors shall meet NEMA-MG 1 requirements.

3.5.3.5 **Control Circuits**. Main and auxiliary control circuits shall operate on a circuit of 120 volts or less derived from isolation transformer integral with the equipment.

3.5.3.6 **Grounding**. All exposed, non-current carrying metal parts shall be maintained at common, zero ground potential. None of the primary circuits in the equipment shall be connected to ground. A grounding stud/lug shall be provided as a means for grounding the equipment. For cord-connected equipment, a NEMA type grounding plug that effectively grounds the equipment for the safety of personnel shall be acceptable in lieu of a ground stud or lug on the equipment.

3.5.3.7 **Over-current Protection**. All electrical components shall be fuse or circuit breaker protected in each phase conductor for AC Circuits and DC circuit conductors. Overloads, fuses and circuit breakers shall be coordinated for maximum component protection and minimum circuit disruption.

3.5.3.7.1 Amperage rating of the fuses or breakers shall be determined by the vendor to meet NEC requirements.

3.6 **EQUIPMENT TO BE PROVIDED**. Portable Shipyard Nitrogen System (PSN$^2$S). The PSN$^2$S shall be self-contained and shall operate with a human-machine interface (HMI) that displays relevant system parameters, including nitrogen purity/oxygen content, feed pressure, nitrogen pressure(s), run status, maintenance hours, trending information of these parameters, and relevant troubleshooting information.

3.6.1 **Portable Shipyard Nitrogen System (PSN$^2$S) Requirements**

3.6.1.1 The Portable Shipyard Nitrogen System (PSN$^2$S) shall be designed and built using industry standard components to support key output parameters discussed. The PSN$^2$S shall be air-cooled. The PSN$^2$S should be fully packaged which includes low pressure air compressor, air drier, process heater, condensate treatment system with condensate pump, booster pump, pressure regulating system, and atmospheric control system, pre and post processing filtration, LED overhead work lights - all mounted in a serviceable configuration on a common base frame and installed in a common shipping container, designed to permit frequent relocation by crane, truck, and forklift.

3.6.1.2 The PSN$^2$S should be self-regulating with fully automatic controls, alarms, and indicators so that the PSN$^2$S package requires direct monitoring or interaction by PSN$^2$S operators no more than once every week (7 days) after initial commissioning and stabilization. The PSN$^2$S is intended to be monitored remotely with future integrations via M2M and DCS solutions. Include adequate automation controls (automatic blowdown valves, automatic pump down systems, self-healing fault condition programming, etc.) to minimize direct system interaction requirements.

3.6.1.3 The PSN$^2$S shall be designed such that when connected to Shipyard supplied electrical service the system is capable of producing nitrogen without any additional utilities such as internet connectivity and without any customer supplied external equipment such as a radiator, cooler, filters, dryers, storage tanks, or catalytic beds.

3.6.1.4 The PSN$^2$S shall be designed to connect directly to and interface with the existing Shipyard temporary nitrogen distribution system as a direct replacement for the existing cryogenic tank supply systems currently in use.

3.6.1.5 **PSN$^2$S Performance Requirements**

3.6.1.5.1 Each PSN$^2$S (Portable Shipyard Nitrogen System) should have a rated nitrogen delivery of a minimum 100 SCFM at 350 psig for periods of at least 40 minutes per drawdown, up to 3 times with a 2-hour recovery period between each drawdown. The control and capacity system in each PSN$^2$S shall automatically accommodate varying flow rates at a discharge header pressure of 350 psig. After initial setting, the PSN$^2$S should not require manual adjustment to accommodate varying flow rates (up to 100 SCFM) while maintaining the discharge header pressure (350 psig). Connection point should be accessible from the exterior of the PSN$^2$S container, CGA-580 style connector with foreign material exclusion (FME) cap on a lanyard or chain.

3.6.1.5.2 The PSN$^2$S should automatically start and stop to accommodate varying usage rates and maintain the high-pressure bottle bank within an operational pressure band above 2,500 psig during static conditions to ensure adequate nitrogen remains available at all times. The normal usage rate will be between 0 SCFM and 100 SCFM for up to 18 months. When not in use for greater than one week, the unit should be able to be manually de-energized and re-energized to conserve energy usage. PSN$^2$S should automatically resume operation if de-energized in run mode with no additional operator action.

3.6.1.5.3 A PSN$^2$S that is in a stopped/depressurized mode should be capable of one full design flow output event (100 SCFM for 40 minutes) within 8 hours of receiving the initial demand signal from the local start button (local HMI) or from integrated remote start commands received from existing/future shipyard IIoT control systems (Allen Bradley/Rockwell Automation compatible tag structure).

3.6.1.5.4 Process Nitrogen leaving the PSN$^2$S shall have a minimum purity of 99.995% meeting all requirements for production, handling, and delivery of Grade A Nitrogen per CID A-A-59155.

3.6.1.5.5 The Portable Shipyard Nitrogen System shall operate as controlled by a stand-alone capable programmable logic controller (PLC) located in the PSN$^2$S container. This PLC will have an Ethernet module and the capability to produce/consume tags from existing/future shipyard IIoT control systems, so that operational parameters such as Nitrogen equipment status and quantity of N2 available from the high-pressure bank can be queried and retrieved by existing and future control room equipment. The PSN$^2$S shall use Allen Bradley/Rockwell Automation compatible PLC/HMI (or similar) command structure. A shielded and grounded Category 6 or similar network connection should be routed to the exterior of the enclosure in an appropriately weather hardened, pass-through cable connection junction box that is pad-lockable to prevent unauthorized connections.

3.6.1.5.6 The PSN$^2$S should include a high-pressure Nitrogen connection point (CGA-680 valve style) on the exterior of the container that is capped, with double valve isolation and bleed off piping provided inside the container. This high pressure Nitrogen connection can be used to obtain gas samples at the boosted bottle bank pressure, connection of an external bottle filling station for portable N2 bottles, connection of an external bottle bank for additional surge volume, or <u>for cross connecting a second PSN$^2$S unit</u> for production redundancy and capacity increase. This connection point may also be utilized by the government to attach a separate refrigeration system for producing Type II (liquid) nitrogen in future applications.

3.6.1.5.7 The PSN$^2$S should include a low-pressure air connection point on the exterior of the container that is capped, with bleed off piping provided inside the container. This low-pressure air inlet connection should be piped such that the PSN$^2$S onboard air compressor can be bypassed with external air provided by the shipyard common air header. Adequate control infrastructure should be included in the control logic (PLC) to allow the external low-pressure air supply to be used in an alternate normal mode of operation for the PSN$^2$S unit. The availability of externally supplied low-pressure air may vary depending on location of installation and time of day. Ideally, the control system should sense and recognize the availability of externally supplied low-pressure air and use the external air preferentially to the onboard compressor.

3.6.1.5.8 The PSN$^2$S should include an HMI that displays oxygen content, feed pressure, nitrogen pressure, nitrogen quantity (SCF) available, run status, maintenance hours, auto standby, onboard and external feed air pressure, and N2 pressures pre and post booster with trending, Oxygen content and

trending, off specification settings, and include a trouble-shooting program/screen that enables deck plate operators to diagnose common system failures.

3.6.1.5.9 The $PSN^2S$ shall include outdoor weather protection and freeze protection for the specified ambient conditions. The $PSN^2S$ shall include adequate control features to allow the $PSN^2S$ to be started and run in cold and hot weather. This could include equipment and procedures for cold weather startup (equipment heaters) or additional climate controls provided inside the enclosure to ensure proper equipment operation.

3.6.1.6 **Portable Shipyard Nitrogen System**. Each $PSN^2S$ should include the following components, capabilities, and characteristics:

3.6.1.6.1 **Design**. The $PSN^2S$ should be of adequate design, using the latest generation of modern, modular, low profile, Pressure Swing Absorption based Nitrogen generator unit(s). The $PSN^2S$ shall be designed for both continuous operation at low demand flow rates (10 SCFM) and/or periodic operation at high demand flow rates (100 SCFM). All components shall be serviceable as assembled with adequate clearances or access panels provided to perform routine maintenance.

3.6.1.6.2 **Valves.** High-pressure connections shall be in accordance with CID A-A-59860 type CGA-680 “Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections.” The valve's design and construction shall be in accordance with CGA V-9, "Compressed Gas Association Standard for Compressed Gas Cylinder Valves." Valves shall be supplied with a safety device known as a pressure relief device (PRD). This safety device shall conform to the design and performance requirements specified in CGA S-1.1, "Pressure Relief Device Standards Part 1 - Cylinders for Compressed Gases", and CGA S-7, "Method for Selecting Pressure Relief Devices for Compressed Gas Mixtures in Cylinders"

3.6.1.6.3 **Soft start**. Reduced voltage starter should be selected and adjusted to accommodate operation of the complete $PSN^2S$ on a 200 amp 480VAC, 3 phase circuit.

3.6.1.6.4 **Integrated control system** capable of establishing and maintaining Nitrogen within CID A-A-59155 standards and 99.995% pure (as measured by the main gas analyzer) by shutting the nitrogen receiver outlet and using the receiver dump valve to purge the nitrogen receiver before out of specification (OOS) gas enters the high pressure booster. The high-pressure booster should be secured as it will lose suction pressure during this event. The $PSN^2S$ should be programed to self-heal by continuing PSA generation until the main gas analyzer results return to specification. Once in-spec, the nitrogen receiver outlet valve should reopen and the high pressure nitrogen booster pump restarted.

In the event that gas purity in the system pressure outlet (purity monitoring unit) approaches the 99.995% purity limit, the $PSN^2S$ should be configured to actuate the maintenance purge valve to dump a reasonable percentage (~33%) of the high-pressure $N^2$ storage bank. This action should not be completed if the main gas analyzer is indicating that inadequate makeup gas is being produced. In other words, don’t dump in-specification nitrogen unless the system is able to make more. If nitrogen purity at the system outlet (purity monitoring unit) ever falls below 99.995% purity, the final PLC controlled valve in the system outlet should be shut to prevent OOS gas from reaching the distribution system.

3.6.1.6.5 **Remote run capability** started from the PLC located in the $PSN^2S$ either locally by the HMI or remotely via future integrations via M2M and DCS solutions.

3.6.1.6.6 **Bottles/Tanks**: High-pressure nitrogen tank(s) should be provided with a 10-year hydrostatic test cycle or longer and a total combined bank size that should support a minimum usable volume of 8,000 SCF of Nitrogen on-hand in a fully charged condition. This may be achieved by utilizing a commercially available 16-bottle rack (CGA-680 valve).

This Nitrogen storage volume should support periodic demands of 100 SCFM for at least 40 minutes per drawdown period, up to 3 times consecutively, with a 2-hour recovery between each drawdown period. A larger high-pressure bank may be required to support a lower recovery rate Nitrogen generator and booster combination. The minimum recovery rate of 13 SCFM post booster may require more than one 16-bottle rack to meet design flowrate and duty cycle. See Figure 1 for example calculations.

Provide a CGA 680 high-pressure gas sample adapter assembly and three high-pressure (maximum system pressure) rated sample containers for sending high-pressure gaseous samples off for laboratory analysis following intrusive maintenance.

Provide a CGA 580 Nitrogen cylinder filling station to fill CGA 580 tank(s) either inside of the containerized PSN$^2$S (if space is available) or a portable/stowable "fill whip" style assembly to fill from the external CGA 680 connection point. Typical usage will be filling from one to five CGA 580 style tanks at a time.

Provide adequate stowage location inside the PSN2S container for secure stowage of all adaptors and sampling accessories when not in use.

3.6.1.6.7 **Gaskets** shall be asbestos free.

3.6.1.6.8 **Spares Locker** shall be included in the weather-protected volume of the PSN$^2$S with manufacturer recommended common on-hand replacement soft goods (o-rings, etc.). Spares locker shall include all manufacturer recommended replacement filters and other maintenance items including required non-standard tooling (such as filter housing wrenches) for a minimum of a 24 month period of operation based on usage example in Figure 1. Any expiration date indicated on the spare parts should be a minimum of 24 months from date of commissioning. Include a laminated inventory list with common part numbers of spares and special tooling.

3.6.1.6.9 **System Connection Hose**: The existing Nitrogen distribution system connects via the following connector: {¾" -16 Male x ¾" O.D. tube 37 degree flare (C-387), Parker 12-8F5OX-SS or equal; NIIN 014961607}. The existing connection point into the nitrogen distribution system is the inlet to the following check valve: {3/4" – 16 female, Circle Seal 249T1-8BB or equal, NIIN 01-239-3612}. Procure or fabricate a hose, approximately 100ft in length, and connect PSN$^2$S system pressure outlet (350 psig regulated CGA 580 (or similar) connection on exterior of PSN$^2$S container) to existing Shipyard Nitrogen distribution system. Length of hose may vary based on final system configuration.

3.6.1.6.10 **Coolers**: The Portable Shipyard Nitrogen System cooling system should incorporate the following features on any installed coolers:

3.6.1.6.10.1 Cooler fins should be coated with a baked or catalyzed coating identified by the coating manufacturer as being appropriate for severe marine environments.

3.6.1.6.10.2 Variable speed cooling fan drive with automatic temperature control for air-cooled components.

3.6.1.6.10.3 Air-cooled aftercooler with moisture separator and fail-safe automatic drain system, if necessary to meet nitrogen generator feed air requirements.

3.6.1.6.10.4 The fan blades shall not be constructed of carbon steel or galvanized carbon steel. The blades shall either be non-metal or they shall be coated with a coating identified by the coating manufacturer as being appropriate for severe marine environments.

3.6.1.6.11 **Drive Motors**

3.6.1.6.11.1 The motors should be ball or magnetic bearing of standard manufacture, NEMA design A/B/C/D as appropriate for purpose.

3.6.1.6.11.2 The main drive motor should be total enclosed fan-cooled (TEFC).

3.6.1.6.11.3 The cooling fan motor should be TEFC.

3.6.1.6.11.4 If a direct drive coupling is used, it must be rated for high temperature, high humidity applications.

3.6.1.6.12 **Lubricating System**

3.6.1.6.12.1 Water lubricated, hydrocarbon free, or dry-seal compressor (booster) shall be used for handling nitrogen in accordance with CID A-A-59155.

3.6.1.6.12.2 Air Compressor shall be equipped with an adequate condensate management system (Air/oil separator) with assisted drain system capable of treating condensate discharge adequately to route pumped discharge to a municipal drain.

3.6.1.6.12.3 Final lubricant carry over from air compressor and post compressor treatment package should not exceed rating of inlet for nitrogen generator.

3.6.1.6.13 **Safety Devices**

3.6.1.6.13.1 Automatic stops should annunciate via an audible alarm and indicate the discrete failure mode by display locally on the HMI. A compatible tag structure to support future integrations via M2M and DCS solutions should be included. The alarm should remain on until the fault condition clears. It should be logical what condition caused the alarm by reviewing the HMI screen locally or M2M and DCS compatible tag structure previously discussed (Allen Bradley/Rockwell Automation or similar) using a ICS/SCADA device in a centralized facility control location. The ability to silence (acknowledge) the audible alarm prior to the fault clearing should be included, without clearing the indication of fault until the fault condition clears. Transient alarm conditions that self-correct or clear on their own should be logged or recorded for trend analysis. Automatic logging of fault conditions should be included in the PLC/HMI feature set. Operational design of alarms and trips should be reasonably self-healing when practicable.

An example of a self-healing alarm could be the Nitrogen purity monitoring system, where in the event that pre-booster Nitrogen purity falls below 99.995%. The $PSN^2S$ unit should take action to secure the booster pump, dump the low pressure nitrogen accumulator, and generate more Nitrogen to attempt to clear the fault condition. When Nitrogen purity becomes 99.995% or better, the $PSN^2S$ unit can resume booster pump operation and clear the fault code. A reasonable maximum number of ~3 attempts per shift of self healing should be attempted before a hard fault shutdown.

Normal Sequence of an out of spec (OOS) or alarming condition:

1. Out of specification condition detected, audible alarm and visual cue that relates to alarming condition.
2. Alarm acknowledged by operator (local or remote), audio alert silenced, visual indication of alarming condition remains.
3. Out of specification condition returns to specification, alarm clears, visual indication stops, alarming condition added to the alarm log.
4. Normal operation resumes.

Ensure HMI operational status communicates to the operator that the $PSN^2S$ unit is attempting to self heal a fault condition or if operator action is required prior to continued operation. The PLC should manage a produce/consume tag group or callable matrix that tracks status of all alarms for future DCS/ICS and M2M integrations. Ensure code allows future remote solutions to acknowledge (silence) alarming conditions.

Note that the ability to cut-out expected alarms should be provided to minimize audible alarm fatigue and promote anticipatory control by operators during planned evolutions. If an alarm is cut-out, HMI display and M2M/DCS tags should still indicate whether the alarming condition exists.

Automatic cutout (silencing) of expected alarms during normal startup and shutdown transitions should be implemented as practicable and these known/expected conditions should not be added to the alarm log.

Warning and recommendation messages may be displayed on the HMI without an audible alarm. The $PSN^2S$ should attempt to self heal prior to an alarming condition. For instance, a warning message can be displayed at 23% ambient Oxygen level and the ventilation fan speeds increased to dissipate Oxygen at a higher rate until the warning clears.

3.6.1.6.13.1.1 Automatic shut-off device: High Oxygen level outside of the $PSN^2S$ container above 23.5% (Sustained for approx. 2 minutes)

Parameter should indicate on the HMI with trend. Should have visible and audible alarm that can be seen/heard outside of the $PSN^2S$ container. Should be clear "HIGH OXYGEN - SECURE HOT WORK WITHIN 35 FEET" or similar visual indication outside of the container. $PSN^2S$ should default to restart automatically approximately 10 minutes after high oxygen condition clears. Auto-restart behavior should be user selectable on HMI and default to a maximum of 3 automatic restarts per 8 hour shift before operator action is required.

3.6.1.6.13.1.2 Automatic shut-off devices: Low Oxygen level inside of the $PSN^2S$ container below 19.5% (Rapidly lowering O2 level should alarm within 5 seconds; sustained low O2 levels below 19.5% should alarm within 2 minutes) – The rapidly lowering O2 alarm should be extra loud (110-120 db) inside of the $PSN^2S$ enclosure and should include voice prompt: "LOW OXYGEN; EVACUATE"

Parameter should indicate on the HMI with trend. Should have visible lighted and audible alarm that can be seen/heard inside ("EVACUATE") and at the normal personnel entry point ("Low Oxygen - DO NOT ENTER") of the $PSN^2S$. The $PSN^2S$ system should default to restart automatically approximately 10 minutes after low oxygen condition clears. Auto-restart behavior should be user selectable on HMI and default to a maximum of 3 automatic restarts per 8 hour shift before operator action is required.

3.6.1.6.13.1.3 Automatic shut-off devices: Over pressure protection. Low Pressure Air Compressor (LPAC) and/or Nitrogen Booster Pump shall shut off prior to pressures reaching relief valve set points.

3.6.1.6.13.1.4 Automatic shut-off device: Condensate treatment system failure. Ensure that condensate collection system high water level alarm should invoke a low pressure air compressor (LPAC) shutdown. PSA generator and booster pump should also trip off; however, system pressure outlet remains available. Should restart LPAC when condition clears.

3.6.1.6.13.1.5 Automatic shut-off device: Excessive Dew Point. Provide warning message at 4 ppm water as read on dew point meter. Shut down booster pump at 26 ppm water and update warning message to "BOOSTER SECURED – purging to lower moisture content" or similar. System pressure outlet remains available. $PSN^2S$ should attempt to self-heal by purging the nitrogen receiver and generating more gas. If condition persists > 2 hours, shut-down the LPAC and PSA generator, sound High Dew Point Alarm. System pressure outlet still remains available.

3.6.1.6.13.1.6 Automatic shut-off device: System design should include solenoid valve trip that secures Nitrogen flow on the 350psig outlet when any of the following conditions are met:

- System flow rate exceeds 200 SCFM (sustained ~2 minutes); Display "Excessive Flow - Possible Leak" or similar
- Downstream regulator pressure exceeds 500 psig (~5 seconds); Display: "Excessive Pressure - Possible Regulator Failure" or similar
- Nitrogen quality at system outlet falls below 99.995% purity (~10 seconds); Display: "Reduced Quality Nitrogen Detected, Maintenance Blowdown Cycle in progress" or similar

The primary concern with this trip is that Nitrogen is used in low ventilation areas in the Shipyard where workers are present. The ability to monitor flowrate and pressure to minimize the chance of suffocation and equipment damage are primary concerns. Typical commercially produced PSA nitrogen generators include a purity control function that will dump the Nitrogen receiver and shut off the Booster Pump prior to charging low quality Nitrogen into the high-pressure tanks. While that feature is expected to be present in this design, adding a second oxygen analyzer (nitrogen quality) after the reducing valve will ensure system redundancy and that process variables between the booster pump suction and the reducer do not introduce impurities into the delivery gas. This will also insure cross-connected supplies (second $PSN^2S$ unit or external bottle bank) do not introduce gas impurities into the service header. This may be accomplished by using an appropriately sized (smaller) orifice for achieving design flow rate through a second flow through style oxygen analyzer coming off the 350 psig supply header.

Provide documentation in the manual for adjusting these parameters using Studio 5000 Logix Designer. Provide ability for operator action to manually override (battleshort) the solenoid valve trip reopening the outlet solenoid immediately from the HMI and future integrated control solution (ICS). Note that future ICS solution references throughout these technical specifications can usually be satisfied by providing adequate documentation of which controller tag is being used to control the function and what value the tag should be to invoke or clear the function remotely, from the ICS.

3.6.1.6.13.2 ASME pressure relief valves. The pressure relief valve shall be designed and located on the Portable Shipyard Nitrogen System in such a way as to direct the discharged air away from personnel.

3.6.1.6.13.3 Emergency stop button with reset feature.

3.6.1.6.14 **Air intake filter system**

3.6.1.6.14.1 Filters shall be located inside the $PSN^2S$ enclosure and be accessible for service.

3.6.1.6.14.2 Filters shall be 5 micron or finer, with 99% or greater efficiency, unless otherwise specified by component manufacturers.

3.6.1.6.15 **Mist separator for the air/oil separator blowdown air outlet**. This separator, in combination with an outlet filter (if needed) shall prevent oil mist from being discharged into the atmosphere.

3.6.1.6.16 **Tank for the collection of condensate from the automatic blowdown**. All condensate and automatic blowdown drains should be routed to a condensate management system that pumps municipal discharge grade treated water to external connection on $PSN^2S$. External threaded NPT connection with a pipe cap installed may include a standard ¾" garden hose thread connection adaptor. Provide hose routing to nearest suitable drain or discharge point. A clearly marked ~30 gallon white (non-yellow) poly temporary drain collection drum may be used for testing purposes.

3.6.1.6.16.1 Inlet air connection for bypassing onboard low pressure air compressor shall be Female 2-inch FED SPEC A-A-59326 (cam and groove), or compatible. Material shall be brass or Stainless Steel 316. The fitting shall connect to the Portable Shipyard Nitrogen System outlet using a National Pipe Taper (NPT) joint. The NPT joint shall be sealed using Teflon tape or a thread sealing compound.

3.6.1.6.17 **$PSN^2S$ Enclosure**

3.6.1.6.17.1 Each complete $PSN^2S$ shall be enclosed in a steel, sound-insulating enclosure. The enclosure shall include doors and panels to provide ready access for normal maintenance.

3.6.1.6.17.2 For major maintenance, the $PSN^2S$ components should be removable from the enclosure per the component manufacturer's lifting guidelines.

3.6.1.6.17.3 The $PSN^2S$ Enclosure should include hinged, removable doors.

3.6.1.6.17.4 The $PSN^2S$ Enclosure shall be stackable, one $PSN^2S$ enclosure on top of one $PSN^2S$ enclosure. When stacked, the top enclosure shall be capable of being secured to the bottom enclosure. The enclosure shall be designed to support frequent relocation.

3.6.1.6.17.5 The walls and ceiling of the $PSN^2S$ enclosure shall have a minimum of R-4 value insulation.

3.6.1.6.17.6 The $PSN^2S$ shall include a drip pan to capture and contain fluid leaks. This drip pan can be incorporated into the $PSN^2S$ enclosure or installed separately. Drip pan shall be designed to not collect rainwater.

3.6.1.6.17.7 The $PSN^2S$ enclosure shall be capable of being transported by crane, forklift, and flatbed truck. The enclosure shall include design features that permit lifting by crane and by forklift without the use of a spreader bar and without removing any components from the enclosure.

3.6.1.6.17.8 The crane lift points shall be four flat pad eyes attached to the enclosure structure and located at the top of the enclosure.

3.6.1.6.17.9 Lifting features shall be designed and certified for the total system weight with the wetted components filled.

3.6.1.6.17.10 Forklift Tine Guides. The $PSN^2S$ enclosure shall include forklift tine guides. The fork lift time guides shall be 11-1/2 inches wide by 5-1/2 inches high +/- 1/8-inch and spaced 4.0 feet +/- 1/8-inch apart. The forklift tine guides shall extend the full width of the enclosure, and be symmetrically located about the center of gravity for safe transport by forklift.

3.6.1.6.17.11 All electrical boxes (termination boxes, junction boxes, fuse safety switch boxes, circuit breaker panels, ATS) shall be mounted using a means that protects against damage from vibrations during transportation.

3.6.1.6.17.12 Electrical boxes shall be NEMA 4X rated.

3.6.1.6.18 Ceiling mounted interior LED light fixtures, including guards and lamps. All fixtures, guards and lamps shall be suitable for use in mercury exclusion areas. Fluorescent bulbs shall not be used. The fixtures shall provide at least 16,000 lumens (combined) illumination, with fixtures distributed over the ceiling to provide illumination throughout the container. Locate light switch for the interior lighting next to the personnel access door.

3.6.1.6.19 Access doors shall be installed at one or both ends of the enclosure. The opening dimensions at each end shall be a minimum of 89 inches high X 90 inches wide (ISO 668:1995 Table 3).

3.6.1.6.20 The container shall have one steel personnel access door measuring at least 30 inches wide X 80 inches high. Personnel door shall include a mechanical push-button lockset with passage feature, lever handle, chrome/stainless finish. The lock shall not use batteries or keys. An example of this type lockset is Grainger part number 49XN84. The door shall include a window in the upper half of the door, with wire-reinforced glass. The window shall be at least 18 inches X 18 inches.

3.6.1.6.21 Recessed panels on the side of the $PSN^2S$ for compressed air, nitrogen, and condensate connections shall be included. Recessed panels shall be sized and located to permit connection of air hoses with locking cams. The compressed air inlet connection shall penetrate the container wall so that hoses can be connected from outside the container. The compressed nitrogen outlet connections shall penetrate the container wall so that hoses can be connected from outside the container. The connections should be installed in a vertical metal plate, recessed from the outer wall so that when the dust caps are installed, the connections and dust caps are recessed one inch from the outer plane of the container wall. The connections through the wall shall be watertight.

3.6.1.6.22 Air-Intake/Exhaust Vents, louvered. Heavy-duty fixed louvers shall prevent wind driven rain from entering the container through the supply air intake during operation.

3.6.1.7 **Minimum Control/Monitoring Equipment on Portable Shipyard Nitrogen System:**

3.6.1.7.1 Digital display, modern UI/UX - PanelView 5510 Studio 5000 compatible terminal HMI display, Touch (2715P-T19CD or similar). Should include protective metal cover; provide a plain, English language display of $PSN^2S$ system (Figure 3) with status, maintenance data, and alarms. Include the following indications:

3.6.1.7.2 Air Dryer Operating Status

3.6.1.7.3 Low Pressure Air Receiver air pressure

3.6.1.7.4 Low Pressure Nitrogen Receiver nitrogen pressure

3.6.1.7.5 High Pressure Nitrogen bank pressure

3.6.1.7.6 Regulated Nitrogen outlet (delivery) pressure

3.6.1.7.7 If filtration is employed to meet CID A-A-59155 specifications (hydrocarbon/particulates), then filters must be monitored as part of the maintenance plan. HMI should include clear on-screen maintenance reminders with run hours until next filter replacement is due. Include a maintenance clock reset function (manually reset once filters are changed).

3.6.1.7.8 Dew-point (Easidew PRO XP configured for ppm water vapor or similar) [included at main gas analyzer]

3.6.1.7.9 Oxygen Percentage inside of the $PSN^2S$ enclosure (OxyTx 200 or similar)

3.6.1.7.10 Oxygen Percentage outside of the $PSN^2S$ enclosure (OxyTx 104 or OxyTx 200 or similar)

3.6.1.7.11 Process gas PPM O2 [main gas analyzer and at purity monitoring unit] (LDetek LDSENZ 1-100ppm ZR Sensor or very similar)

3.6.1.7.12 Percent of $PSN^2S$ high-pressure storage bank full (calculated/estimated by PLC using flow meters and bank pressure).

3.6.1.7.13 Hour meter (Hobbs or similar) displaying $PSN^2S$ running time, not resettable

3.6.1.7.14 Standby light – when HP bank is full

3.6.1.7.15 Power-on light.

3.6.1.7.16 Portable Shipyard Nitrogen System run light.

3.6.1.7.17 Alarm bell.

3.6.1.7.18 Lamp test switch. (if lamps are used for warnings/alarms/indications)

3.6.1.7.19 Alarm acknowledge (bell cut-out)

3.6.1.7.20 Low Pressure Air Compressor: Bypass (OFF) / Bypass (Standby) / Auto

Note: Bypass (Standby) means LPAC will come on if air receiver pressure drops below ~100 psig due to inadequate external air supply.

3.6.1.7.21 Off/Auto switch

3.6.1.7.22 Emergency STOP button

3.6.2 **Construction Requirements**

3.6.2.1 Fasteners exposed to the weather and fasteners used to attach components to the shipping container shall be monel, K-monel, or stainless steel alloy 304 or 316.

3.6.2.2 Fasteners, other than those pre-installed on components, shall be self locking or secured with a locking compound.

3.6.2.3 ASME relief valve(s) shall have intact wire seals on their adjustment caps.

3.6.2.4 Relief valve discharges, drains, vents, and other discharge points shall be arranged so that they do not discharge toward workers.

3.6.2.5 All components which can drip or leak shall have drip trays or cofferdams under them. Drip trays that collect water condensate shall have drains, with condensate treatment system, routed to outside the shipping container. These drains shall terminate in a threaded NPT connection with a pipe cap installed (GHT adaptor may be included). A stainless steel tether shall attach the cap to the enclosure. The valve shall be on the interior of the enclosure.

3.6.2.6 Electric and control wire connections exposed to weather shall be routed inside conduit, except as stated below:

3.6.2.7 Control wire (PLC) connection for temporary connection between $PSN^2S$ and the ICS shall be rated for outdoor use with sunlight resistant sheathing. These control wires shall terminate in plugs that match existing standard female RJ-45 Ethernet network connector on the PLCs Ethernet bridge connection. This minimum shielded category 6 wire should be routed to an ICS connection box on the exterior of $PSN^2S$. It should be lockable in-use weatherproof Extra Duty (Legrand WIUC20FRED) or similar.

3.6.2.8 The Portable Shipyard Nitrogen System shall include freeze protection for all components that could be adversely affected by prolonged freezing weather while the equipment is running or not running. If available, a heater option shall be selected for startup in cold weather.

3.6.2.9 Pressurized piping and all pressurized equipment shall be mounted to rigidly supported structure inside the shipping container. Components shall be strongly mounted to prevent vibration during shipment or while in use. They shall also be arranged for protection from mechanical damage, abuse, or being used as a stepping point.

3.6.2.10 Piping shall be supported by structure and stainless steel or galvanized pipe supports. The supports shall inhibit vibration during shipment of the assembly, maintain alignment of components during maintenance and operation, and prevent damage to components in the event of personnel contact.

3.6.2.11 The vendor shall not drill holes through the shipping container walls or ceiling for the purpose of mounting equipment. Stud welding or weld mount adhesive fasteners to walls and ceiling is acceptable.

3.6.2.12 Components shall be braced sufficiently to prevent damage during shipping

3.6.2.13 No components should project beyond the outside edge of the shipping container. This is needed to protect the components from damage when large heavy containers are slid up to and along the edges of the shipping container.

3.6.2.14 Castings and forgings shall be free from defects, scale and mismatching. Processes such as welding, peening, plugging, or filling with cold solders or metallic pastes shall not be used on castings or forgings for reclaiming any parts of the equipment.

3.6.2.15 Welding, and/or brazing shall be employed only where those operations are included in fabrication of the original design. These operations shall not be employed as repair measures for defective parts. All such processes shall comply with applicable American National Standards Institute (ANSI) as defined by the American Welding Society (AWS) Standard AWS A3.0: 2001, with Steel Welding in accordance with AWS D1.1 and Aluminum Welding in accordance with AWS D1.2.

3.6.2.16 Dissimilar metals shall not be used in direct contact with each other without suitable means for preventing electrolytic corrosion.

3.6.2.17 Wording and numbers on control panels, instruments and plates shall be in the English language, permanently and legibly displayed in bold face characters on a contrasting background.

3.6.2.18 All operator controls, instrumentation and indicators shall be mounted to be convenient to operating personnel. All such devices shall be clearly and legibly marked for function and identification. Each control shall be fitted with suitable handle(s), push-button(s), or control knob(s), as applicable. Gages and instruments shall be designed for re-calibration. Pressure gages shall be calibrated in the U.S. system of measurement "psig", temperature gages in "°F".

3.6.3 **The PSN$^2$S shall comply with the following regulatory requirements**

3.6.3.1 NEC. The nitrogen generator as a whole and each of the component parts shall comply with the National Electric Code.

3.6.3.2 ASME. The Portable Shipyard Nitrogen System shall comply with the applicable ASME boiler and pressure vessel code.

3.6.3.3 UFC 3-430-07. Inspection and Certification of Boilers and Unfired Pressure Vessels.

3.6.3.4 UL: Electric and control components shall be listed by the Underwriter's Laboratory, or equal (NRTL), for use in weather in the installed configuration.

3.6.3.5 NFPA, NEMA, and ANSI. All electrical components including motors, starters, relays, switches, and wiring shall conform to and be located in accordance with the applicable NFPA, NEMA, and ANSI standards for the intended application.

3.6.3.6 EPA. Environmental Protection; The unit shall be designed and constructed so that during operation, service, transportation and storage conditions described herein, including final disposal, the equipment will comply with all applicable Environmental Protection Agency (EPA) and Occupational Safety and Health Agency (OSHA) and State of Washington Department of Ecology (WDOE) restrictions for materials classified as

hazardous to the environment in effect on the date of the contract. The equipment described herein shall not contain or emit material hazardous to the ecological system as prescribed by federal, state, and local statues in effect at the point of installation.

3.6.4 **Coatings and Markings**

3.6.4.1 The $PSN^2S$ enclosure shall be primed on the interior, exterior, and underside with zinc rich epoxy primer, an intermediate coat of epoxy, and two topcoats of aliphatic urethane. The coatings shall be applied in accordance with the manufacturer's instructions and shall be compatible with each other. The surface shall be cleaned and blasted to SSPC-SP10(or better if required by manufacturer's instruction) prior to application. Zinc rich epoxy primer shall conform to MIL-DTL-24441C(SH) Type III Formula 159. An example of this type of paint is Sherwin Williams brand N10A359 (Part A), N10V359 (Part B). Final topcoat shall be black or off-black color.

3.6.4.2 All fabricated subassemblies which require coating shall be painted prior to assembly into the enclosure.

3.6.4.3 All weldments shall be cleaned and smoothed and weld spatter removed prior to painting.

3.6.4.4 Caution - Warning Plates - Corrosion resistant "Caution" or "Warning" plates shall be securely attached to the equipment in visible locations, with any safety precautions to be observed by the operator or maintenance personnel permanently marked on the plates. Warning plates required by ASME B 19.1 shall also be installed.

3.6.4.5 Identification Plate. An identification plate shall be furnished with the equipment. A nameplate shall be affixed to each major component of the system showing the manufacturer's name, equipment model, year of manufacture, and any other pertinent information for identifying the part as a unique component of the system.

3.6.4.6 Gages, readouts, and displays on all components, including OEM gages on the Portable Shipyard Nitrogen System, air dryers, and other components shall read in the U.S. customary units; (inches, pounds, degrees Fahrenheit, pounds per square inch, hours/minutes/seconds, etc.).

3.6.4.7 Each major component of the system, including but not limited to, the Portable Shipyard Nitrogen System and the electric motor, shall have the manufacturer's name and serial number stamped on a metal plate attached to the component. No metal stamping is permitted on any surface subjected to high stresses in service, except as permitted by the applicable portions of the ASME boiler and pressure vessel code.

3.6.4.7.1 Component Identification Plate**.** Component identification (ID) plates shall be furnished with each component of the equipment. The component ID plate shall be affixed to each major component of the system showing: equipment nomenclature, the manufacturer's name, year of manufacture, weight of component, drawing number, contract number, serial number (S/N), "Asset I.D" number (a blank line shall remain empty for use by the Government "asset I.D. number"), and any other pertinent information for identifying the part as a unique component of the system. Plates shall be made of corrosion resistant stainless steel. Plates shall be mechanically fastened to structure using stainless steel threaded fasteners. The ID plate shall provide pertinent information of the system nomenclature.

3.6.4.8 A current certificate of inspection shall be attached to each pressure vessel in the compressed air system in accordance with UFC 3-430-07.

3.6.5 **Transporting**

3.6.5.1 For safe transport by forklift the Portable Shipyard Nitrogen System container shall include forklift tine guides. The fork lift time guides shall be 11-1/2 inches wide by 5-1/2 inches high +/- 1/8-inch and spaced 4.0 feet +/- 1/8-inch apart. The forklift tine guides shall be symmetrically located about the center of gravity for safe transport by forklift.

3.6.5.1.1 The forklift tine guide slots shall be box sections extending the full width of the $PSN^2S$ unit so that a fork lift truck could access either side.

3.6.5.2 For transport by crane, the $PSN^2S$ unit shall have lugs or lifting eyes (standard shipping container corner fittings meet this requirement). The $PSN^2S$ container unit's lifting eye calculations shall meet the requirements specified previously.

3.6.5.3 Each PSN$^2$S shall have a label recording the container weight (with fluids), sling arrangement, minimum sling length, equipment dimensions and center of gravity for both its length and width clearly marked.

## 3.7 TECHNICAL DATA TO BE PROVIDED

3.7.1 **Engineering Data**. The following engineering data for the Portable Shipyard Nitrogen System shall be provided to Puget Sound Naval Shipyard.

3.7.1.1 [Line Deleted]

3.7.1.2 A copy of the PE stamped structural calculations demonstrating compliance with the Lifting and Handling section of this specification.

3.7.1.3 The contractor shall disclose all test(s) conducted in-house on the Portable Shipyard Nitrogen System and provide the associated test report(s) to the PSNS & IMF contract representative 14 days prior to arrival on-site.

3.7.1.4 Calculations showing that the Portable Shipyard Nitrogen System is capable of producing outlet flowrates as described in Figure 1.

3.7.1.5 The contractor shall provide their plan of actions (with milestones) for the successful completion of the contract. The plan shall include, as a minimum; design schedules, manufacturing schedules, equipment delivery schedules, set-up schedules and final completion date.

3.7.1.6 Drawings shall show component locations including, location of utility connection(s), (power, air, etc.), shall indicate all equipment requiring energy lockout devices and any other utility requirements necessary for the testing of the proposed equipment.

3.7.1.7 The Government shall notify the contractor in writing within ten (10) working days of receipt of the drawings if they comply with this specification and if shipment can begin.

3.7.2 **Documentation.** The Portable Shipyard Nitrogen System documentation shall include:

3.7.2.1 Technical manual for the Portable Shipyard Nitrogen System. The manual shall include operating instructions, maintenance instructions, and a maintenance schedule for all the components of the Portable Shipyard Nitrogen System.

3.7.2.2 PSN$^2$S shipping container structure and lifting eye calculations

3.7.2.3 Schematic diagrams of the air system and electrical system

3.7.2.4 Drawings with parts lists and part numbers identifying all serviceable components.

3.7.2.5 List of consumable parts and local source for parts

3.7.3 **Operator / Maintenance / Repair Manuals.** The manufacturer shall provide standard Operation, Maintenance, and Repair Manual(s) for equipment.

3.7.3.1 The manuals shall include all mechanical and electrical schematics showing discrete components/block diagrams/wiring diagrams with inputs and outputs identified/system electrical interface documents and drawings for the specific model of all machine equipment/drives/controls supplied.

3.7.3.2 The information contained in the manual(s) shall reflect the unit and its components in the “as built” configuration shall be in the English language, shall be adequate to permit trouble shooting and repair of the equipment by journeymen level personnel, and shall be in U.S. customary units of measure. The manuals shall have illustrations and schematic drawings of all utilities, illustrations of all major components, and detailed explanation of control system operation & overall system operation. The manuals shall have a tabular listing of all set points, alarm conditions, and expected operating ranges for each of the sensors and gages. Operating procedures for start-up, operation, shutdown and extended shutdown of the system shall be included. An illustrated listing of parts, part numbers, and manufacturer contact information shall be included if not listed elsewhere.

3.7.4 **Recommended Consumable Spare Parts**. The vender shall provide a list of recommended consumable spare parts and possible sources for procurement.

3.7.5 **PCB Certification**. The Contractor shall provide written certification from the manufacturer that the equipment contains no detectable PCBs (less than two (2) parts-per-million (PPM)). The certification shall be on manufacturer's letterhead, and signed by a company official who is empowered to provide same.

3.7.6 **PCB Label Plate**. A label plate containing the PCB Certification information shall be permanently affixed to the equipment in the vicinity of the manufacturer's identification plate. The certification label shall be engraved or etched on wear and corrosion resistant material.

3.7.7 **Design Submittals.** The contractor shall schedule a design concept review meeting with the Contract Office Representative, early in the concept development stage, to assess the adequacy of the proposed design to meet the functional objectives and requirements of this document.

3.7.8 **Design Drawing(s).** Within thirty (30) days after award of contract, the contractor shall submit the preliminary design and layout drawing(s) to the PSNS & IMF contract representative for government evaluation and approval. The contractor shall not proceed with fabrication of the Portable Shipyard Nitrogen System until the government has approved in writing the final revision to the contractor design drawing(s). Final government approval for contractor design drawing(s) should be accomplished within 60 days after award of contract. In addition, for each manufactured item included in the $PSN^2S$, the contractor shall submit the respective manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog cuts. Examples of manufactured items are (this list is not all inclusive): LPAC, PSA Nitrogen Generator, desiccant air dryers, oil-coalescing pre-filters, particulate after-filters, programmable logic controller, HMI, and general piping arrangement.

3.7.9 **Drawing Review**. PSNSY&IMF Code 2340 will review submitted design drawings and materials; and provide comments within 10 working days. Upon receipt of review comments from the Contract Office Representative, the contractor will have a maximum of 10 working days to incorporate comments and resubmit the revised design to the Contract Office Representative for review by PSNS&IMF Code 2340.

3.7.10 **Revised Design Review**. PSNS&IMF Code 2340 will review the revised design. At this time, if there are any unresolved design issues or the need to clarify emergent aspects of the design, the contractor shall schedule a final design review meeting with the Contract Office Representative to review the proposed design and to achieve agreement with PSNS&IMF Code 2340 on the actions needed to meet the functional objectives and requirements.

3.7.11 Representatives from PSNS shall be granted access to the contractor's facility to observe progress during all phases of Portable Shipyard Nitrogen System construction/assembly.

3.7.12 Failure of the customer to identify a problem or lack of specification compliance during this review process shall not relieve the vendor of responsibility for meeting all requirements of these specifications.

3.7.13 **Pressure vessel certification and data sheet**. The contractor shall provide a signed, written certification of compliance from the manufacture to the requirements of paragraph 2.5.1 - **ASME - Section VIII coded tank** for any pressure vessel provided under this contract Included shall be two (2) copies of the Manufacturers Data Report for Pressure Vessels, Form U-1A or similar.

3.7.14 **OSHA Compliance Statement** - The contractor shall provide signed, written certification of compliance to the requirements (**OSHA NRTL 3rd Party Approved Certification**) with the equipment and a copy to the Receiving Activity's Safety and Health Office. This certification shall include NRTL certification listing information for the $PSN^2S$, be on manufacturer's letterhead, and signed by a company official who is empowered to provide same. Failure to provide this certification will delay acceptance of the equipment, and could result in rejection for failure to comply with the terms of the contract

3.7.15 **Certificate of Compliance (CoC)** - The contractor shall provide a CoC for the Portable Shipyard Nitrogen System. The CoC shall state all inspections and tests have been completed satisfactory and indicate full compliance with all contract requirements.

3.8 **Warranty**. Supplies and services furnished shall be covered by warranty from defects in design, materials and workmanship. The warranty shall be the manufacturer's standard commercial warranty that shall conform to all the requirements of the contract. Acceptance of the manufacturer's standard commercial warranty

shall not minimize the rights of the Government under clauses in the contract, and in any conflict that arises between the terms and conditions of the contract and manufacturer's warranty, the terms and conditions of the contract shall take precedence. The warranty period shall commence when final acceptance has been achieved as determined when all contract line item numbers have been processed through the Procurement Integrated Enterprise Environment (PIEE) as indicated per paragraph 4.6

3.8.1 **Operational Tests at Origin:** Prior to delivery, the fully assembled Portable Shipyard Nitrogen System shall be operated by the vendor at the vendor's facility for a minimum of eight hours. The vendor shall contact the customer's "Activity Point of Contact" identified in section 5.1 of this specification two weeks prior to testing to allow the customer the option of being present for the tests. During this test the vendor shall monitor the pressure, dewpoint, flow rate, and purity and demonstrate the controls and indicators. Data shall be recorded during the test. Failures and problems during this test shall be corrected prior to delivery. All components modified or repaired after testing shall be retested at the vendor's facility prior to shipment.

## 4.0 QUALITY ASSURANCE PROVISIONS

4.1 **RESPONSIBILITY FOR INSPECTION**. The Contractor shall be responsible for the performance of all inspection requirements (examinations and tests) as specified herein. The Contractor may use its own facility or any other facility suitable for the performance of the inspection requirements specified herein. The Government reserves the right to perform any of the inspections set forth in this specification, where such inspections are deemed necessary to assure supplies and services conform to the prescribed requirements.

4.2 **RESPONSIBILITY FOR COMPLIANCE.** All items shall meet all requirements of sections 3 and 5. The inspection(s) set forth in this specification shall become part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspections, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.3 **BASIC PERFORMANCE TESTS**. Basic performance tests shall be conducted on the primary equipment and all associated equipment to the extent practicable, to demonstrate functionality. The tests shall be performed either by the Contractor personnel of their service organization directly, or by an independent testing agency.

4.4 **TEST AT ORIGIN**. At the option of the Government, tests may be witnessed by a representative of Puget Sound Naval Shipyard who shall have the option of sending their technical representative(s) to witness the tests. The Contractor shall schedule and coordinate the test at origin at least fifteen days prior to the test; the Contractor shall notify the Government Point of Contact of the scheduled date, time, and location of the test.

4.5 **INSPECTION AT DESTINATION**

4.5.1 **Initial Test and Grooming**. The equipment delivered with the system shall be inspected by the Government for mechanical and electrical integrity as follows:

4.5.1.1 All welds shall be inspected for integrity and appearance.

4.5.1.2 Surfaces shall be examined for sharp edges and burrs.

4.5.1.3 Fasteners shall be checked for tightness and if fixed to prevent loosening due to vibration.

4.5.1.4 Paint will be checked for flaking and blistering.

4.5.1.5 Electrical requirements shall be examined for compliance to the National Electrical Code, (NFPA 70/79).

4.5.1.6 The fit of parts shall be observed, with particular reference to the interchangeability of those which are likely to require replacement. **Note**: Faults will be duly recorded and presented to the contractor for rectification.

4.5.2 **Operational Tests**. Upon satisfactory completion of the inspections above, the equipment shall be setup for an operational test and evaluation by the Contractor.

4.5.2.1 The vendor will set up and operate the Portable Shipyard Nitrogen System in the presence of the Government. During this period, the Portable Shipyard Nitrogen System will be allowed to operate for several hours while the discharge flowrate is varied and the control system is monitored. Flow settings / system demand will at a minimum test the following approximate flow rates: 0 (instrumentation purge supply only), 25 scfm, 50 scfm, 100 scfm, and 200 scfm (excessive flow trip condition). Testing shall include demonstration of PLC functions for startup / shutdown of Portable Shipyard Nitrogen Systems and protective / safety features. The Government will provide primary source of electricity and alternate source of air.

4.5.2.2 The contractor shall demonstrate the ability of the equipment to meet standards required in paragraph 3.1.3 of this specification.

4.5.2.3 All equipment functions shall be exercised to the extent necessary to prove proper operation in accordance with specification requirements.

4.5.2.4 The system shall function, without failure, for the duration of this test period.

4.5.2.5 If a failure occurs during the test period, repairs shall be immediately effected by the Contractor, and the tests shall be restarted from the first test.

4.5.2.6 Three (3) failures without completion of the test period may be considered cause for rejection of the system.

4.5.2.7 For the purpose of this test, a "failure" is defined as any equipment malfunction which requires remedial action to restore the system to full operation in accordance with contract specifications.

4.5.3 **Noise Level Test**. The Shipyard Industrial Health and Safety Department shall conduct a noise level survey using a certified sound level measuring instrument. Four random measurements shall be taken at the operator's work position(s) and at each side and end of the equipment. For each measurement, the microphone shall be located on a straight line which is perpendicular to the surface/corner being measured and at a height corresponding to the point of the highest noise level emitted from the surface/corner at the herein specified location or distance from the equipment. Each sample shall be **84** dB (A scale) or less. For each measurement, the microphone shall be located on a straight line which is perpendicular to the surface/corner being measured and at a height corresponding to the point of the highest noise level emitted from the surface/corner at the herein specified location or distance from the equipment.

4.5.3.1 For each measurement the microphone shall be located in a straight line which is perpendicular to the surface/corner being measured and at a height corresponding to the point of the highest noise level emitted from the surface/corner at the herein specified location or distance from the equipment.

4.5.3.2 Each sample shall be **84** dB (A scale) or less.

4.5.3.3 Provisions for Repair and Retest. In the event of a test failure, the contractor, at their discretion, may elect to correct the failed condition and request a retest of the system.

4.6 **FINAL ACCEPTANCE**. Upon satisfactory completion of set-up, inspection, testing of the Portable Shipyard Nitrogen System, and on-site training, the contractor shall utilize electronic invoicing. Invoices must be submitted using Wide Area Workflow (WAWF) in the Procurement Integrated Enterprise Environment (PIEE) – Receipt and Acceptance. The contractor shall self-register at the web site: https://piee.eb.mil. Contractor training is available on the Internet. Additional support can be accessed by calling the NAVY WAWF Assistance Line: 1-866-618-5988.

4.7 **Submittals**: Attachment 1 (List of Submittals) provides a list of submittals required per this technical specification. Submittals are designated either for PSNS & IMF Approval or for Informational Only. The contractor should expect submittals for approval to involve multiple submittals and discussions with PSNS & IMF personnel before final versions are approved. PSNS & IMF shall provide written approval within 10 days after receiving final submittals. The contractor shall provide one hard copy and one electronic copy of all submittals, unless otherwise specified in Attachment 1 (List of Submittals) or as approved by PSNS & IMF contract representative. Electronic copies shall be in PDF format and emailed to the PSNS & IMF contract representative.

Hard copies shall be high quality and copy machine reproducible. Drawings shall be a minimum size of 8-1/2 inches by 11 inches unless otherwise approved by the PSNS & IMF contract representative. Mail hard copies to the following address:

Commander,
Attn: Code 2340.12
Bldg. 850A, 3rd Floor
Puget Sound Naval Shipyard & Intermediate Maintenance Facility
1400 Farragut Avenue Stop 2077
Bremerton, WA 98314-2077

## 5.0 DELIVERY

5.1 **Receiving Activity Point of Contact**. The receiving activity, Puget Sound Naval Shipyard, Point Of Contact is Aaron Berger, Code 2340.12 Innovations at (360) 801-3198.

5.2 **Delivery Date**. It is required that all goods and services provided by this solicitation be delivered no later than 330 days after award of the contract (See paragraph 5.11).

5.3 The Portable Shipyard Nitrogen System shall be delivered FOB Puget Sound Naval Shipyard.

5.4 The following shall be delivered with the equipment: Receipt inspection checklist; packing list, operation manuals sufficient to support acceptance testing; and a procedure for testing the $PSN^2S$ at Puget Sound Naval Shipyard. The procedure shall include a schematic diagram of the test setup, detailed step-by-step test instructions, data sheets, pass/fail criteria, and safety information.

5.5 For all components in the $PSN^2S$, the vendor shall provide all parts required by the maintenance schedule to be replaced within the first 2000 hours of operation as part of this contract. This requirement can also be met by paragraph 3.6.1.6.8.

5.6 **Arrival of Personnel** The receiving activity shall be notified no less then 48 hours prior to the arrival at the site of the contractor's personnel, which have been issued a Security Pass/ID Badge by PSNS Pass and I.D. Office, or any equipment associated with this contract.

5.7 **Shipment of Materials**. Shipment of materials shall be coordinated with site preparation. Material transportation from the manufacturer's facility to the work site shall be the responsibility of the Contractor. Limited secured storage areas at the facility will not permit the Government to store material for extended periods of time. Early shipment of materials, without the permission of the receiving activity may be refused.

5.8 **Delivery Condition.** The unit shall be protected from damage or contamination during shipment. Note: Yellow packaging, packing, preservation and marking, in any form or manner, regardless of the method of preparation specified, is prohibited. All air supply system connections shall be delivered with a blank, cap or plug installed to prevent entry of any debris during shipment.

5.9 **Packing Material**. The use of shredded paper, whether newspaper, office scrap, computer sheets, or wax paper, in packing material for shipment to Navy activities, is prohibited.

5.10 **Location**

Puget Sound Naval Shipyard
1400 Farragut Avenue
Bremerton, WA. 98314-5001

5.11 **Delivery**. This is a "Turn-Key" System. It is the Government's intent that the Contractor deliver a fully operational and functional system meeting the requirements stated herein prior to acceptance by the receiving activity and final payment by the Government. Delivery of this "Turn Key" system shall occur when all deliverable

items of this contract have been received, set up and made operational and the contractor has demonstrated and the receiving activity has confirmed that the system meets or exceeds the requirements set forth in this specification and is ready for Government use. The contractor shall be present for system startup, and operator training after delivery. The date for startup and training shall be agreed upon between the contractor and the Government.

## 6.0 ADDITIONAL REQUIREMENTS

### 6.1 ADMITTANCE TO THE WORK SITE

6.1.1 Upon contract award, employees or representatives of the Contractor will require access to the Puget Sound Naval Shipyard Controlled Industrial Area (CIA) and shall be admitted to the work site only after they have been issued a Security Pass/ID Badge.

**Notice**: Persons who are currently on probation or parole from a felony conviction cannot qualify for a Security Pass/ID Badge and will be denied access to the Shipyard.

6.1.2 Access to Puget Sound Naval Shipyard Controlled Industrial Area (CIA) is restricted as follows:

6.1.2.1 Contractor personnel requiring access badges for unescorted entry into the CIA will be required to provide personal background information to the extent necessary to obtain a Security Pass/ID Badge.

6.1.2.2 A minimum of five (5) working days prior to start of work, each employee or representative of the Contractor requiring access to the work site shall submit to a security background check.

6.1.3 **Badges**. The following is required to issue badges:

6.1.3.1 A request for Visitor Badge, PSNS Form 5512/127, completed by the sponsor (typically the Contracting Officer or the Receiving Activity Point of Contact) and submitted by the sponsor (Receiving Activity Point of Contact) to the Pass and I.D. Office, at least five (5) business days before the badges are needed.

6.1.3.2 Proof of U.S. Citizenship. Contractors working within the CIA are required to be United States citizens and must show proof of citizenship prior to receiving a badge. Acceptable forms of proof are:

6.1.3.3 Original Birth Certificate

6.1.3.4 Original Department of State Birth Certificate

6.1.3.5 Certificate of Person Born Abroad

6.1.3.6 Original Naturalization Certificate

6.1.3.7 Valid United States Passport

6.1.3.8 **NOTE**: Proof of U.S. citizenship shall be hand carried by the employee to the Pass and I. D. Office located in Bldg. 981, when picking up the badge.

6.1.3.9 The Government will issue badges without charge.

6.1.3.10 Contractor shall allow approximately two (2) hours for each employee to acquire a badge.

6.1.3.11 Contractors, their subcontractors and vendors requesting access to the CIA will be required to view an orientation videotape lasting approximately 30 minutes prior to receiving a badge.

6.1.3.12 Each employee shall visibly display/wear the Government issued badge chest high over the front of their outermost clothing.

6.1.3.13 It shall be the Contractor's responsibility to collect and account for all Security Pass/I.D. Badges issued to their personnel upon termination of any employee, expiration of the badge, completion of the contract, or when access is no longer required. Badges, passes and permits shall be returned to the Pass and I.D. Office immediately.

6.2 **FOREIGN NATIONALS OR AFFILIATIONS**. Foreign Nationals (non U.S. Citizens) or persons affiliated with, or employed by, a foreign, or foreign owned company will not be granted access to Puget Sound Naval Shipyard CIA without prior written approval from Commander, Naval Sea Systems Command (NAVSEA).

6.2.1 The Government will provide a standard background information data form for obtaining NAVSEA approval of foreign nationals. This form can be obtained from the Contracting Officer or the Receiving Activity Point of Contact.

6.3 **VEHICLE PASSES**

6.3.1 Contractors will be allowed to bring company vehicles into the CIA based upon the nature of their work as determined by the Commanding Officer in conjunction with the Industrial Security Officer.

6.3.2 Vehicles and equipment required by the Contractor to complete this contract must be registered with Shipyard Security prior to being allowed access to Puget Sound Naval Shipyard.

6.3.3 Forms for obtaining vehicle passes and permits may be obtained from the Receiving Activity Point of Contact.

6.3.4 Each contractor, subcontractor and vendor vehicle shall be registered with the Pass and I.D. Office located in Bldg. 981.

6.3.5 Contractors shall clearly display an authorized company sign or logo on their vehicle. Failure to comply may result in ticketing and/or loss of vehicle privileges.

6.3.6 Contractor vehicles are not allowed to enter the CIA with more than three (3) people onboard.

6.3.7 After contract award, the Contracting Officer will issue a memorandum that lists the vehicles a contractor will be allowed to bring into the CIA.

6.3.8 Each permit will include the company name, license plate number and expiration date.

6.3.9 CIA permits will be issued to each authorized vehicle by license number.

6.3.10 Each contractor, subcontractor and vendor shall provide the state registration or a photocopy and proof of insurance documents of each approved vehicle to the Pass and I.D. Office where one of the following Vehicle Permits will be issued:

6.3.11 Lay-down Permit. A permit that authorizes the vehicle to be brought in to transport tools, parts or materials to/from the site or function as a work platform. Vehicles with Lay-down permits are kept at the negotiated job site when not traveling to/from the gate.

6.3.12 Load/Unload Permit. A permit that authorizes the vehicle to be brought in to drop off tools, equipment and machinery that can not be hand carried then is taken out of the CIA. Vehicles with Load/Unload Permits shall not be left unattended at the job site for more than 30 minutes.

6.3.13 Service Permit. A permit that authorizes the vehicle to be brought in and used as a mobile work platform because it contains tools, parts, materials, supplies and/or fabrication equipment. Vehicles with Service Permits allow the vehicle to be used at job sites throughout the CIA where no negotiated lay-down area exists.

6.4 **RESTRICTIONS**

6.4.1 **Sanitation** – Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS & IMF) prohibits the consumption of food except in designated areas.

6.4.1.1 Per the Code of Federal Regulations, 29 CFR 1910.141, Sanitation, employees may not eat or drink in regulated work areas or in other industrial work areas where toxic materials are present.

6.4.1.2 Hardhats, gloves and any other regulated work clothing shall not be worn or placed in designated eating areas.

6.4.2 **Smoking** – Smoking is permitted in designated areas only.

6.4.3 **Parking** - Vehicles and equipment required by the Contractor to complete this contract must be registered with Shipyard Security. Contractor vehicles must be marked on the outside with the company name or logo or both. Failure to comply will result in ticketing and/or loss of vehicle privileges.

6.4.4 **Contractor Vehicles**. Vehicles and equipment required by the Contractor to complete this contract must be registered with Shipyard Security prior to being allowed access to PSNS as outlined in paragraph 6.3.

6.4.5 **Regular Working Hours**. All work is to be performed during Puget Sound Naval Shipyard's regular work hours from 7:30 a.m. to 4:00 p.m., Monday through Friday except for Federal Holidays. If the Contractor desires to work on Saturdays, Sundays, holidays, or outside the regular or specified hours/days, the Contractor shall submit a request to the receiving activity Project Manager (Code 2340) for approval a minimum of two (2) working days prior to the anticipated work date. In no event shall a Contractor carry on work outside the hours and days specified in the contract without prior approval.

6.4.6 **Restricted Colors**. This Shipyard uses the colors magenta, yellow, red and blue to identify specially controlled materials. The Contractor is specifically prohibited from using magenta, yellow, red or blue colored plastic wrapping materials or bags, tape, or other covering materials.

6.4.7 **Radio Restrictions**. Operation of privately owned citizens band or amateur radio equipment (receive and transmit) within the geographic limits of the Shipyard is prohibited.

6.4.7.1 All radio equipment installed in privately owned motor vehicles must be turned off upon entering the Shipyard premises.

6.4.8 **Privately Owned Personal Computers And Cellular Telephones**. The use of privately owned personal computers and cellular telephones by contractor personnel at Puget Sound Naval Shipyard is restricted. Contractors requiring such devices in the performance of this contract shall obtain a copy of the applicable parts of this instruction from the Contracting Officer.

6.4.9 **Photography/Recording**. Contractor personnel are prohibited from having photographic equipment, tape recorders, or other recording devices in their possession while inside the Shipyard Controlled Industrial Area (CIA). This includes cell phones with cameras.

6.5 **PERSONAL HEALTH AND SAFETY**

6.5.1 **Compliance With OSHA**. All work described herein shall be performed in an industrial manufacturing area and shall be conducted under the guidelines of OSHA and the local Naval OSH Office. Contracting personnel shall perform all work in accordance with the latest OSHA rules and regulations issued by the Department of Labor, 29 CFR Parts 1910, 1915, and 1926 as applicable.

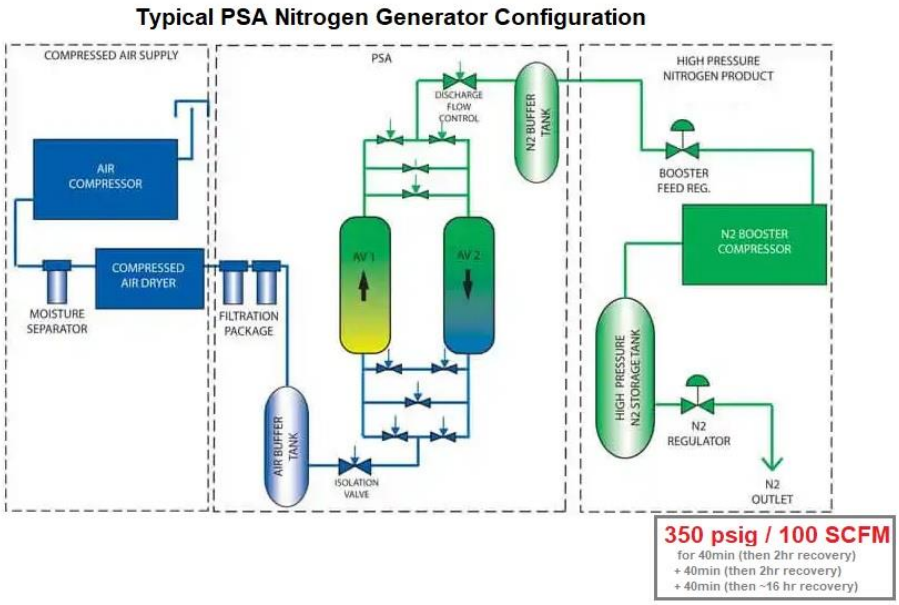
6.5.2 **Prior to commencing work**. The Contractor representative(s) shall meet in conference with the Site Manager (PSNSY Code 980.2), shop supervision, and other necessary Shipyard personnel to discuss and develop mutual understandings relative to the administration of the Shipyard Safety Program.

6.5.3 **Safety Equipment**. The Contractor shall provide their employees with all necessary safety equipment during the performance of work on this contract.

6.5.3.1 All contractor personnel shall have in their possession and shall properly wear OSHA approved personnel protective safety equipment (i.e. hard-hats, steel-toe safety shoes, safety glasses and hearing protection).

6.5.3.2 The Contractor shall provide all appropriate safety barricades, signs, and signal lights required to properly isolate the area of work.

**Figure 1: Typical PSA Nitrogen Generator Configuration and calculations**




The Federal Potato Chip company uses 99.995% pure nitrogen at 350 psig to sparge their vats of potato chip oil every day on 3rd shift. The vats of oil are sparged for 40 minutes at 100 SCFM and then sampled. Samples take two hours to be analyzed. If samples show that oil needs more sparging, the sequence is repeated up to 2 more times during the 8 hour shift. Potato chip production resumes on 1st and 2nd shift, vats of oil are not sparged during production time. The sparge and sample process resumes on 3rd shift.

Example 1: What "N2 Booster Compressor" recovery rate is needed for the minimum "High Pressure N2 Storage Tank" size of 8,000 SCF (usable)?

8,000 SCF – (40 min x (100 SCFM) + (recov rate x 120 min) – (40 min x 100 SCFM) + (recov rate x 120 min) - (40 min x 100 SCFM) = >0

Solve for recovery rate: (8000 SCF bank – 12,000 SCF used) / 240 min = 17 SCFM recovery rate

Example 2: What "High Pressure N2 Storage Tank" size is needed with the minimum "N2 Booster Compressor" recovery?

N2 bank SCF – (40 min x 100 SCFM) + (13 SCFM x 120 min) – (40 min x 100 SCFM) + (13 SCFM x 120 min) - (40 min x 100 SCFM) = >0

Solve for N2 bank SCF: ~ 3,000 SCF recovered – 12,000 SCF used = 9,000 SCF (usable) High Pressure N2 Storage Tank

Notes: The minimum recovery rate specified (13 SCFM) and the minimum high pressure N2 storage tank size (8,000 SCF usable) were selected to eliminate concerns with minimum standby supply (to recover from PSA trip-off events), other plant nitrogen demands during less-limiting evolutions, and recovering banks adequately in under 2 shifts. Calculations disregard recovery rate during sparge events.

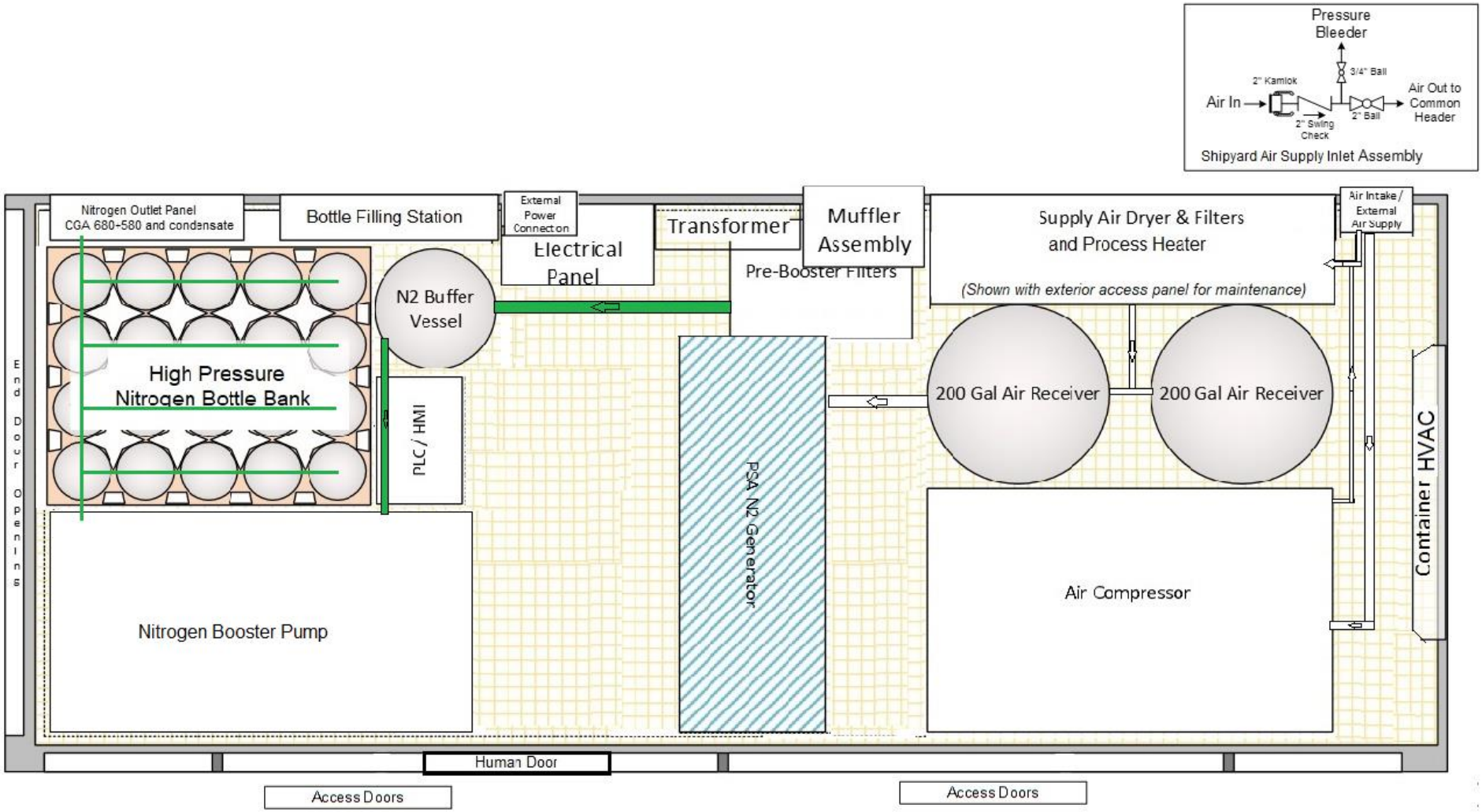



FIGURE 2 - Portable Shipyard Nitrogen System
- General Schematic Overview –
See written description for full details

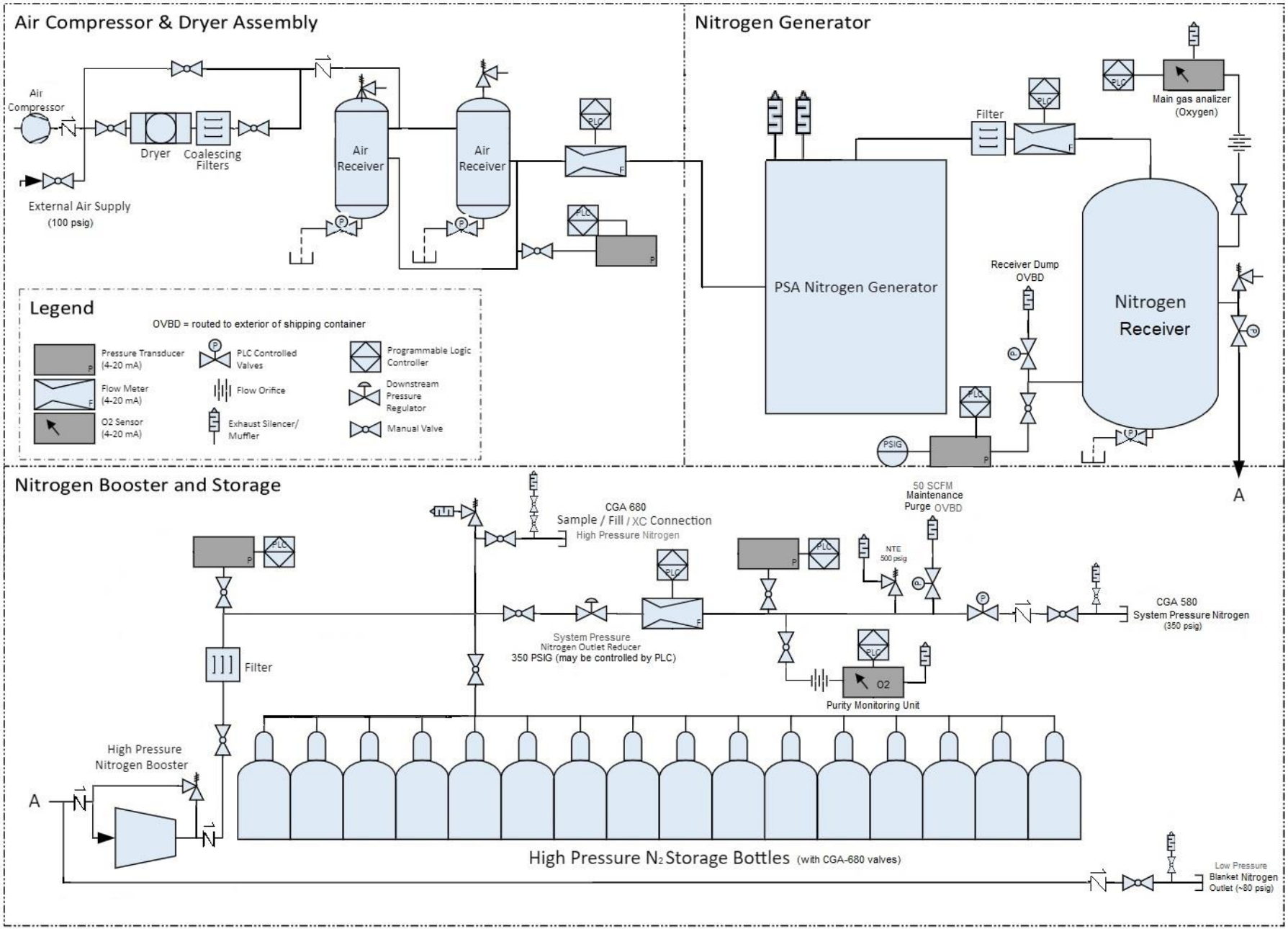



Figure 3: Portable Shipyard Nitrogen System – General Schematic Overview

## Appendix A: Environmental Safety and Health Requirements for the Bremerton Naval Complex

1.0 **SCOPE** These specifications provide environmental and safety information and procedures required for any work performed at Bremerton Naval Complex (BNC), Bremerton, WA. This includes Puget Sound Naval Shipyard, Naval Station Bremerton, any tenant activities within BNC boundaries, and ships moored within the BNC.

2.0 **APPLICABLE DOCUMENTS**. The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on the date of a request for proposals or request for quotes shall apply.

2.1 **NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

2.1.1 NFPA 70 National Electric Code

2.1.2 NFPA 79 Electrical Standards for Industrial Equipment

2.2 **CODE OF FEDERAL REGULATIONS (CFR)**

2.2.1 29 CFR 1910 Occupational Safety and Health Standards

2.2.2 29 CFR 1926 Safety and Health Regulations for Construction

2.2.3 40 CFR 122 EPA Administered Permit Programs: The National Pollutant Discharge Elimination System

2.2.4 40 CFR 261 Identification and Listing of Hazardous Waste

2.2.5 40 CFR 403 General Pretreatment Regulations for Existing and New Sources of Pollution

(Application for copies should be addressed to Superintendent of Documents, Government Printing Office, Washington DC 20402)

2.3 **ENVIRONMENTAL PROTECTION AGENCY (EPA)**

2.3.1 EPA 832-R-91-005 Storm Water Management for Construction Activities

2.4 **WASHINGTON STATE ADMINISTRATION CODE (WAC)**

2.4.1 WAC 173-60 Maximum Environmental Noise Levels

2.4.2 WAC 173-303 Washington Dangerous Waste Regulations

2.4.3 WAC 173-304 Minimum Functional Standards for Solid Waste Handling

2.5 **WASHINGTON STATE DEPARTMENT OF ECOLOGY (WSDE)**

2.5.1 Washington State Storm water Management Manual for the Puget Sound Basin

2.6 **PUGET SOUND CLEAN AIR AGENCY (PSCAA)**

2.6.1 PSCAA Regulation I, II, and III

2.7 **PUGET SOUND NAVAL SHIPYARD & INTERMEDIATE MAINTENANCE FACILITY (PSNS & IMF)**

2.7.1 P5100 (14) Handbook for Contractors and Visitors

2.7.2 P5090 (4) Contractor's Guide to Environmental Compliance

2.7.3 P5090 (5) Contractor's Guide to Hazardous Waste Compliance

(Request for copies should be addressed to Puget Sound Naval Shipyard & Intermediate Maintenance Facility, 1400 Farragut Avenue Bremerton, WA 98314-5000)

## 3.0 GENERAL REQUIREMENTS

3.1 **All documentation**/correspondence and/or communication specified in these specifications shall be submitted to the Contracting Officer or their designated Government Representative.

3.2 **Mutual Understanding Meeting**. Prior to commencing work: The Contractor shall meet in conference with the Contracting Officer, and other necessary Government personnel to discuss and develop mutual understandings regarding administration of the Environmental and Safety Program, methods and schedules, security, waste management, and any other subject necessary for a smooth and successful operation.

### 3.3 Environmental & Safety Compliance, General Awareness Training, and Regulatory Interface

3.3.1 Contractors working at the Bremerton Naval Complex (BNC) are required to perform their work in compliance with all Federal, State, and local regulations pertaining to the environment at all times.

3.3.2 The Contractor is responsible for complying with the environmental regulatory notices or orders, including payment of any fines attributable to the Contractor's conduct, regardless of whether or not the contractor is the name recipient of the notice, order, or fine.

3.3.3 The Contractor is responsible to perform all duties and responsibilities for environmental and safety compliance set forth in this contract. The Contracting Officer can use failure to comply with the responsibilities for environmental and safety requirements as a basis for termination for default.

3.3.4 Failure to comply with or repeated violations of local, state, or Federal regulations can result in the violator(s) losing their access to the BNC or the operation being suspended until the Contractor can provide properly trained personnel. Certification of training shall be presented upon request by the Contracting Officer. The Contractors (including its employees) loss of access to the BNC will not be considered by the Contracting Officer as a basis for an adjustment to the contract for additional costs incurred by the Contractor.

3.3.5 The Contractor shall be responsible for conducting routine inspections of the work and storage areas to maintain compliance with the cleanliness, material and waste management, air and water pollution controls, and provide general oversight on the environmental issues associated with this contract.

3.3.6 Contractors shall ensure all their personnel working at this work-site and their supervisors, including their sub-contractors, are familiar with the contents of "Contractor's Guide to Environmental Compliance," NAVSHIPYDPUGET P5090 (4) (5-97). Document the general awareness training provided to all employees.

3.3.7 All contacts with environmental regulatory agencies shall be coordinated with the Contracting Officer in advance. Documents requested by a regulatory agency must be turned over to the Contracting Officer. The Contracting Officer will review and forward document(s) to the requesting agency. The contractor shall provide the Contracting Officer with a copy of any related correspondence/record of communication between the contractor and the regulatory agency in a timely manner.

### 3.4 Definitions – Technical:

3.4.1 Bremerton Naval Complex (BNC). A contiguous property comprised of Naval Station Bremerton, Fleet and Industrial Supply Center, Puget Sound, Puget Sound Naval Shipyard, any tenant activities and ships moored within the BNC.

3.4.2 Contractor. The term Contractor refers to both the prime Contractor and subcontractors. The prime Contractor shall ensure that his/her subcontractors comply with the provisions of this contract

3.4.3 Dangerous Waste. Defined under WAC 173-303. This includes, but is not limited to, hazardous waste, extremely hazardous waste and state-only dangerous waste.

3.4.4 Fugitive Dust. Particulate matter, or any visible air contaminants (smoke, dust, or fume) other than uncombined water, that is not collected by a capture system and emitted from a stack, but is released to the atmosphere at the point of generation.

3.4.5 Hazardous Material. Any material which, by virtue of its potentially dangerous nature (e.g., toxic, flammable, corrosive, oxidizing, irritating, sensitizing, reactive), requires control in its use, packaging, handling, storage, or stowage, to assure safety to life and property. This definition is intended to apply to proprietary industrial, commercial, or locally prepared blends, mixtures, formulations, or compounds of gases, liquids, and solids intended for use at the job site.

3.4.6 Hazardous Waste. See definition for dangerous waste.

3.4.7 Solid Waste. Any solid, semi-solid, or liquid waste that has not been designated as dangerous waste, asbestos, or PCB.

3.4.8 Volatile Organic Compound (VOC). An organic compound that participates in atmospheric photochemical reactions. This excludes all compounds determined to have negligible photochemical reactivity by the U.S. Environmental Protection Agency and listed in 40 CFR 51.100(s) in effect July 1, 1998.

4.0 **MANAGEMENT OF HAZARDOUS MATERIALS**

4.1 **Hazardous Materials**. The Contractor shall submit the following for approval prior to introduction to the site:

4.1.1 An inventory of hazardous materials to be used in the work, on a Contractor Hazardous Material Inventory Request (CHMI). Inventory shall be approved by the Government Site Manager prior to bringing it onto the BNC. Allow 10 working days for processing the request. This inventory shall be updated with actual quantity usage at the completion of the project and submitted with the Contractor's final report. If the contract runs beyond the calendar year, submit an inventory for the hazardous materials consumed as of 31 December of the current year to the Contracting Officer by 15 January of the following year.

4.1.2 A labeling system to identify the contents of all containers on site, per 29 CFR 1910.1200, Hazard Communications Standard. This shall include as minimum the following:

Chemical Name

Manufacturer's Name and Address

Explanation of the Chemical Hazard

4.1.3 An implemented plan for protecting personnel, property, and the environment during the transport, storage and use of the materials, as specified in 29 CFR 1910.1200 Hazard Communication Standard. A brief summary of the program is outlined in NAVSHIPYDPUGET P5100 (14), Handbook for Contractors and Visitors. This booklet is available through the Contracting Officer.

4.1.4 Hazardous Waste Minimization Certification. The Contractor shall submit completed Certification.

4.2 **Hazardous Material Exclusions**. Notwithstanding any other hazardous material usage permitted under this contract, radioactive materials or instruments capable of producing ionizing radiation as well as materials which contain asbestos, mercury, methylene chloride, lead, or polychlorinated biphenyls are prohibited. Contractor exceptions to the use of any of the above excluded materials must be submitted for approval by the Contracting Officer.

4.3 **Unforeseen Hazardous Material**. If material that may be dangerous to human health upon disturbance is encountered during contract performance, the Contractor shall stop that portion of work and notify the Contracting Officer immediately. If the situation is an immediate threat to human health or the environment, call 911 on a Shipyard phone or 476-3333 on an outside line or cellular phone.

5.0 **HANDLING AND DISPOSAL OF WASTE**. Puget Sound Naval Shipyard is the owner of all waste (hazardous or otherwise) generated within the BNC. This includes waste generated by Contractor personnel while working at BNC.

5.1 **Waste Identification and Designation**

5.1.1 Any item or material not incorporated into the project and not reusable will be considered a waste.

5.1.2 The Contractor is responsible for identifying all wastes to be generated or produced during performance of this contract. They shall complete Section 1 of a Waste Information Sheet (WIS) for each identified waste.

5.1.3 The Government (Code 106.34) shall designate all waste associated with the project. The Government (Code 106.34) shall perform any analysis required for designation of waste. See Encountered Waste Summary.

5.2 **Waste Management**

5.2.1 The Contractor is responsible for the identification of all waste generated at the work-site.

5.2.2 All waste awaiting designation and hazardous waste shall be accumulated in a contractor-operated, Satellite Accumulation Area (SAA) that has been approved by C/106.33 or turned over to the Government for accumulation and disposal prior to the end of each work shift. All waste shall be accompanied by a Waste Information Sheet (WIS).

5.2.3 In no event shall any waste, including wastewater, be disposed of in the storm sewer system.

5.2.4 Discharge to the sanitary sewer is also prohibited without written authorization from the Contracting Officer via the Waste Information Sheet (WIS) process.

5.3 **Solid Waste**

5.3.1 Solid waste shall be segregated at the source and containerized to prevent spills or discharges to the environment. Cover and contain all solid waste as to prevent it from blowing away and to prevent water run-on or run-off. The area around the solid waste collection areas shall be kept clean and free of debris.

5.3.2 Dispose of solid waste in containers specified by the Government Representative prior to the end of each work shift.

5.4 **Dangerous Wastes**

5.4.1 Under no circumstances shall the Contractor remove the dangerous/hazardous waste from the BNC premises. The Shipyard will retain ownership of all dangerous waste.

5.4.2 Unless an on-site accumulation area operator is arranged, the Contractor will be required to contact the Government Representative prior to the start of any work which will result in the generation of dangerous waste.

5.4.3 Containers and labels shall be provided by the Government and may be requested through the Government Representative. Containers and labels are available for pick-up in the Controlled Industrial Area, Bldg. 367 of PSNS, Monday through Friday between the hours of 0745-1600. Back shift hours (1600 – 2350) are available upon request. Bulk containers require 7-day notice.

5.4.4 Label containers with an ID label, PSNS 5090/82 to identify the type of waste. Apply hazardous waste label, PSNS 5090/81 and DOT label(s) as specified by the Government on the WIS.

5.4.5 Turn waste over to a Government operated accumulation area prior to the end of the work shift. A WIS with Section I completed shall accompany the waste.

5.4.6 Provide the Material Safety Data Sheet and other supporting data as requested.

5.5 **Waste Awaiting Designation**

5.5.1 Undesignated waste (i.e. waste for which designation as hazardous, problem, or non-hazardous waste has not been completed) shall be turned over to the Government prior to the end of the work. All samples and testing required for designation will be taken and performed by the Government.

5.5.2 The Contractor will complete Section 1 of a WIS and an ID label for each container of waste. Include the letters "WAD" in the space below the "ID" located on the left side of the ID label.

6.0 **SPILLS**. The following is provided to ensure that all Contractor personnel, including subcontractors, performing work at the BNC are aware of and understand spill prevention, spill events, and the proper response for each type of event.

6.1 **Spill Prevention**. Contractors shall take all reasonable and necessary precautions to prevent Oil and Hazardous Substances (OHS) from reaching the air, ground, or waterway

6.2 **Spill Event**. A spill is any unpermitted or uncontrolled release of oil or a hazardous substance to the water or ground. This includes any spilling, leaking, pumping, emitting, discharging, injecting, escaping, leaching, disposing, or dumping of liquid or solid material not authorized by the contract. There are two types of spill events, emergency and non-emergency.

6.3 **Emergency Spill Event**

6.3.1 Is an immediate threat to human health or the environment, or

6.3.2 Is a material not known to the person discovering the spill, or

6.3.3 Has the immediate potential to enter or has entered a drain or waterway, or migrate off Government property, or

6.3.4 Requires assistance from the Government for cleanup, or

6.3.5 Is more than 10 gallons

6.4 **Non-emergency Spill Event**. A non-emergency spill event is anything not specified as an emergency spill event.

6.5 **Spill Response Procedures**. The following applies to spills caused by the Contractor during contract performance:

6.5.1 In the event of an emergency spill, the Contractor shall immediately notify the BNC Naval Emergency Services Communication (NESCOM) by calling 911 on BNC phone, or (360) 476-3333 on a non-BNC or cellular phone.

6.5.2 The Contractor shall isolate the spill area and stay upwind until arrival of the BNC clean up crew.

6.5.3 If the Contractor knows the properties of the spilled material, they shall, providing it can be done without endangering the safety or health of the Contractor or other personnel, try to stop the spill and/or contain the spill to prevent it from going into drains or waterways

6.5.4 The Contractor shall then notify the Government Representative.

6.5.5 The Government will respond to all emergency spills.

6.5.6 The Contractor may be requested to assist the Government clean-up crew. All available technical data (e.g., MSDSs and waste profiles) the Contractor possesses on the material spilled shall be provided upon request to emergency response personnel.

6.5.7 The Contractor shall assist Shipyard personnel in the preparation of spill reports if requested.

6.5.8 The Contracting Officer shall be provided with all relevant data necessary to determine financial impact and liability of the spill and reimbursement for assistance of spill clean-up and disposal services.

6.5.9 In the event of a non-emergency spill, the Contractor shall stop the source of the spill, contain the spilled material and keep it away from drains or waterways. Block any drains near the spill if there is a chance the spill will reach them.

6.5.10 Contractor personnel shall wear the proper personal protective equipment while cleaning up a spill.

6.5.11 Waste debris shall be turned over to the Government accumulation area operator as waste awaiting designation.

## 7.0 WATER POLLUTION

7.1 **Water Pollution Control**. Comply with the Federal Clean Water Act, 40 CFR 122, and 40 CFR 403. Provide a WIS for each unique type of wastewater and fill out the blank label to be provided by the Government. In no event shall waste or any other material be disposed of into Sinclair Inlet or the storm sewer system. Discharge to a sanitary sewer drain (e.g., sinks & toilets) is prohibited unless prior authorization has been obtained (via the Waste Information Sheet). Allowing non-approved discharges may result in a direct violation of regulations and/or permits issued by the Environmental Protection Agency (EPA), or the Washington Department of Ecology (WDOE).

7.2 **Best Management Practices**. Identify potential sources of pollution, which may reasonably be expected to affect the quality of stormwater discharge from the site. Select applicable Best Management Practices from EPA 832-r-92-005 AND WSDE SMM. The Contractor's Guide to Environmental Compliance, NAVSHIPYDPUGET P5090 (4) offers additional information and will be provided by the Contracting Officer. An additional pamphlet entitled BEST MANAGEMENT PRACTICES (BMPS) is also available upon request. The pamphlet and guide will help explain what type of practices that need to be identified and utilized for Contractor activities. Pollution prevention practices include but are not limited to good housekeeping; proper materials storage and handling; drip pans, control of dust and over-spray, over-water protection, protection of storm drains, and preventive maintenance of equipment.

## 8.0 AIR POLLUTION CONTROL AND REPORTING

### 8.1 General Requirements

8.1.1 Containers of paint, epoxy, solvents, or other volatile organic compounds (VOCs) are not to be left open to the atmosphere unless they are being used. All containers are to be secured at the end of each shift. Evaporation of solvents shall not be used as a means of minimizing or disposing of dangerous waste.

8.2 The Government must self-report National Emissions Standards for Hazardous Air Pollutants (NESHAP) violations to the Puget Sound Clean Air Agency. Respond to the Contracting Officer in writing within two working days, whenever a NESHAP violation has been detected. Provide details of corrective actions taken as specified in the written request.

8.2.1 1. Gasoline transport tanks may not be used at the BNC unless a valid inspection sticker is displayed on the vehicle showing the date of the last tank inspection and the tank identification number.

8.2.2 2. Report the usage of Volatile Organic Compounds (VOCs) and Toxic Air Contaminants to the Contracting Officer. Completion and submission of the Contractor Hazardous Material Inventory, specified in the Hazardous Material section, will satisfy this reporting requirement. The report will be made at the end of each calendar year, and at the end of the project.

8.2.3 3. Ensure air contaminant generating equipment is maintained in good working order as specified by the manufacturer. Periodically inspect air pollution control equipment (dust collectors, vacuum recovery units, etc.) and ensure that any deficiencies are promptly repaired. Secure operation of such equipment if immediate repairs are not feasible. Maintain records on-site of any repairs made, also include records of the latest preventive maintenance performed. Be prepared to provide records for review, within 20 minutes, when requested by regulatory agencies such as the Puget Sound Clean Air Agency (PSCAA) following the procedures specified in Section I (c) (5).

8.2.4 4. Utilize Best Available Control Technology (BACT) to minimize dust emissions. The control measures mentioned below merely represent some examples of control techniques necessary to prevent fugitive emissions and are not to be construed to represent an all inclusive list of BACTs.

8.2.4.1 Use controls at all times when visible dust emissions are created during both working and non-working periods. Dry power brooming shall not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming.

8.2.4.2 Employ water sprays to prevent visible emissions of dust generated by demolition, handling, and transport. Materials removed during renovation shall either be carefully lowered to the ground (not thrown) or transported via dust-tight chutes into the disposal container. Discharge of water run-off into the storm drain is not permitted.

8.2.4.3 Employ methods to confine over spray from outdoor spray painting to the work area where painting is occurring, such as tarps, shrink wrap, mobile enclosures, or similar methods of over spray control. Minimize over spray with the use of high efficiency spray equipment such as HVLP, LVLP, electrostatic, or air assisted airless. Airless spray equipment may also be used where low viscosity and high solids coatings preclude the use of higher transfer efficiency spray equipment.

8.2.4.4 Employ water sprays or total enclosure (or both) at transfer points in the area in which visible dust is generated. Provide covers, wetting of materials or adequate freeboard as necessary to prevent loss of particulate matter in transit.

8.2.4.5 Secure grinding, blasting, and painting during windy periods when other BACTs are not effective.

## 9.0 HEALTH AND SAFETY

### 9.1 Personal Health and Safety

9.1.1 Contractor work performed at the BNC is typically in an industrialized area and is subject to OSHA Standards. The Contractor shall conduct all work in a safe manner and shall provide all necessary safety equipment.

9.1.2 The Contractor shall make the maximum use of low-noise emission equipment as certified by the Environmental Protection Agency. Applicable regulatory requirements for maximum environmental noise levels are published in the Washington Administrative Code, WAC 173-60. The Contractor shall provide hazardous noise signs and label equipment wherever work procedures and equipment produce sound-pressure levels greater than 84 dB (A) steady state and/or 140 dB peak sound pressure level for impact or impulse noise, regardless of the duration of the exposure.

9.2 **Compliance With OSHA**. Contracting personnel shall perform all work in accordance with the most current OSHA rules and regulations issued by the Department of Labor, 29 CFR Parts 1910, 1915, and 1926 as applicable.

9.3 **Safety Equipment**. During the performance of work under this contract, all Contractor personnel shall have in their possession and shall properly wear OSHA approved personnel protective safety equipment (i.e. hard-hats, steel-toe safety shoes, safety glasses and hearing protection).

9.4 The Contractor shall provide all appropriate safety barricades, signs, and signal lights.

9.5 Safety Inspections

9.5.1 The Contractor's work space may be inspected periodically for compliance with OSHA Standards.

9.5.2 Abatement of violations will be the responsibility of the Contractor and/or the Government as determined by the Contracting Officer.

9.5.3 The Contractor shall provide assistance to the Safety Office escort and the federal OSHA inspector if a complaint is filed. Fines levied on the Contractor by federal OSHA offices due to safety/health violations shall be paid promptly by the Contractor.

### 9.6 Accident Reporting

9.6.1 The Contractor shall submit to the Contracting Officer, using the cognizant regulatory agencies prescribed forms, exposure data and all accidents resulting in death, trauma, or occupational disease. Accident reports shall be submitted within 24 hours of their occurrence.

9.6.2 The Contractor shall submit to the Contracting Officer a full report of damage to Government property or equipment by Contractor employees. Damage reports shall be submitted within 24 hours of the occurrence.

9.7 **Emergency Medical Care**. Only emergency medical care is available in Government facilities to Contractor employees who suffer on-the-job injury or disease. Care will be rendered at the rates in effect at the time of treatment. Reimbursement shall be made by the Contractor to the Naval Regional Medical Center Collection Agent upon receipt of statement.

9.8 **Overhead Crane Clearance Envelope**. To allow for the safe travel of overhead traveling cranes, the Contractor shall not modify existing buildings or place equipment or temporary structures in any way, which would affect the working envelope of overhead traveling cranes and hoists. Minimum clearances for working envelopes are:

9.8.1 1. Top clearance: a minimum of three (3) inches between the highest point of the crane and the lowest overhead obstruction. In areas where truss sag may become a significant factor, the Government will evaluate the need to increase the minimum clearance.

9.8.2 2. Side clearance: a minimum of two inches between the end of the crane and side obstructions (building columns, knee braces, walls, etc.) assuming crane is skewed in the worst case situation on the runway rails. Piping, electrical conduits, etc. must not reduce this clearance.

9.9 **Fire Protection**. The Contractor and his employees shall know where the fire alarms are located and how to turn them on. The Contractor shall handle and store all combustible supplies, materials, waste, and trash in a manner that prevents fire or hazards to persons, facilities, and materials. Contractor employees operating critical equipment shall be trained to properly respond during a fire alarm or fire.