1. SCOPE

1.1. Scope. This purchase description reflects those characteristics which are essential to the minimum needs of the Government for a Main Seawater Flushing System (MSWF). The system will be utilized by Portsmouth Naval Shipyard (PNSY) for cleaning and flushing seawater piping systems aboard U.S. Navy vessels using aqueous acid solution marine descalers. The system's machinery and piping shall be containerized to permit movement of the system via crane lifts, forklifts, and tractor trailer. The system's storage tanks shall be configured to permit movement via crane lifts and tractor trailer. The system shall be portable over the road, on normal size trailers, without special transportation permits. It is the Government's intent that a contract be awarded to a single primary contractor to deliver a complete and useable system meeting the requirements stated herein.

2. APPLICABLE DOCUMENTS

2.1. General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2. Government Documents.

2.2.1. Attachments. The following attachments form a part of this document.

Attachment A ---------- Aqueous Acid Solution Marine Descalers for Use with the Main Seawater Flushing System

Attachment B ---------- Contractor Access Requirements and Work Restrictions at Portsmouth Naval Shipyard, Kittery, ME

2.2.2. Specifications, Standards, and Handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

COMMERCIAL ITEM DESCRIPTION

CID A-A-59326 ---------- General Specification for Coupling Halves, Quick-Disconnect, Cam-Locking Type (2011)

(Copies available online at https://assist.daps.dla.mil/quicksearch/)

FEDERAL STANDARDS

FED-STD-H28A ---------- Screw Thread Standards for Federal Service (1994)

FED-STD-313D w/ Change 1 ---------- Material Safety Data, Transportation Data, and Disposal Data for Hazardous Materials Furnished To Government Activities

FED-RR-C-271D ---------- Chains and Attachments, Welded and Weldless

(Copies available online at https://assist.daps.dla.mil/quicksearch/)

MILITARY STANDARDS

MIL-STD-130N ---------- Identification Marking of U.S. Military Property

MIL-STD-1628 ---------- Fillet Weld Size, Strength, and Efficiency Determination

MIL-STD-2035A ---------- Nondestructive Testing Acceptance Criteria

MIL-A-8625F ---------- Anodic Coatings for Aluminum and Aluminum Alloys

(Copies available online at https://assist.daps.dla.mil/quicksearch/)

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

T9074-AS-GIB-010/271Chg Notice 1 -- Requirements for Nondestructive Testing Methods (1999)

(Copies available at http://ww.ihs.com or IHS, 321 Inverness Drive South, Englewood, CO 80112)

2.2.3. Other Government Publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

CODE OF FEDERAL REGULATIONS

29 CFR 1910----------Occupational Safety and Health Standards (OSHA)

29 CFR 1915----------Occupational Safety and Health Standards for Shipyard Employment

33 CFR 154 ----------Facilities Transferring Oil or Hazardous Material in Bulk

33 CFR 156.170----------Oil and Hazardous Material Transfer Operations; Equipment Test and Inspections

40 CFR 261 ----------Identification and Listing of Hazardous Waste

40 CFR 264.193----------Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; Containment and Detection of Releases

(Copies available online at http://www.gpo.gov/fdsys)

2.3. Non-Government Publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z535.4 ----------Product Safety Signs and Labels (2011)

(Copies available at http://webstore.ansi.org/ or ANSI Attn: Customer Service Department, 25 W 43rd Street, 4th Floor, New York, NY 10036)

ASME INTERNATIONAL (ASME)

ASME B16.5 ----------Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard

(Copies available at http://www.asme.org or ASME, Information Central Orders/Inquiries, P.O. Box 2300, Fairfield, NJ 07007)

AMERICAN SOCIETY OF SANITARY ENGINEERING

ASSE 1013----------Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced

Pressure Principle Fire Protection Backflow Preventers (2009)

(Copies available at http://www.asse-plumbing.org/ or American Society of Sanitary Engineering, 901 Canterbury, Suite A, Westlake, OH 44145)

ASTM INTERNATIONAL (ASTM)

ASTM B466/B466M ----------Standard Specification for Seamless Copper-Nickel Pipe and Tube (2009)

ASTM D1998 ----------Standard Specification for Polyethylene Upright Storage Tanks (2006)

ASTM D3951 ----------Standard Practice for Commercial Packaging (2010)

(Copies available at http://www.astm.org or ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428)

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511----------Reduced-Pressure Principle Backflow Prevention Assembly (2007)

AWWA C700----------Cold-Water Meters—Displacement Type, Bronze Main Case (2009)

(Copies available at http://www.awwa.org or American Water Works Association, 6666 W. Quincy Avenue, Denver, CO 80235)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1 ----------Industrial Control and Systems General Requirements (2000, R2008)

NEMA ICS 6 ----------Industrial Controls and Systems: Enclosures (1993, R2011)

NEMA ICS 7 ----------Industrial Control and Systems: Adjustable-Speed Drives(2006)

NEMA MG 1 ----------Motors and Generators (2011)

NEMA 250----------Enclosures for Electrical Equipment (1000 Volts Maximum) (2008)

(Copies available at http://www.nema.org/stds/ or National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 ----------National Electrical Code (2011)

NFPA 79 ----------Electrical Standard for Industrial Machinery (2012)

(Copies available at http://www.nfpa.org or NFPA, 1 Batterymarch Park, Quincy, MA 02169)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 1496-1----------Series 1 Freight Containers – Specification and Testing – Part1: General Cargo Containers for General Purposes

ISO 4414 ----------Pneumatic Power - General Rules and Safety Requirements for Systems and Their Components (2010)

(Copies available at http://webstore.ansi.org/ or ANSI Attn: Customer Service Department, 25 W 43rd Street, 4th Floor, New York, NY 10036)

2.4. Order of Precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1. Design. The MSWF shall be designed to perform chemical cleaning of marine growth from shipboard sea water systems, on both waterborne and dry docked vessels, using aqueous acid solution marine descalers listed in Attachment A. The system shall be designed to perform continuous outdoor operations in an industrial pier side environment, with ambient temperatures ranging from 10°F to 105°F. The system shall be designed to withstand exposure to brackish water, salt, dust, and wind driven rain and snow.

3.1.1. Use of English. Wording on all component labeling, diagrams, drawings, manuals, safety and informational charts and plates, and any other text data required by this specification shall be written in American English.

3.1.2. <u>Safety and Health Requirements</u>. All machinery parts, components, mechanisms, and assemblies furnished on the MSWF, whether or not specifically required herein, shall comply with all of the applicable requirements of 29 CFR 1910.

3.1.2.1. <u>Safety Guarding</u>. Covers, guards, or other safety devices shall be provided for all parts of the equipment the present safety hazards. The safety devices shall prevent unintentional contact with the guarded part, and shall be removable to facilitate inspection, maintenance and repair of the parts.

3.1.2.2. <u>Safety Signs and Labels</u>. Safety signs and labels in accordance with ANSI Z535.4 shall be securely attached to the equipment in visible locations, at the point of hazard(s), with any safety precautions to be observed by the operator or maintenance personnel permanently marked on the signs.

3.1.2.3. <u>Safety Color Code</u>. Colors of markings for physical hazards shall conform to ANSI Z535.1 and 29 CFR 1910.144.

3.1.2.3.1. <u>Hinged Covers and Doors Enclosing Physical Hazards</u>. Inside surfaces of hinged covers or hinged enclosure doors, which are guarding belts, pulleys, and electrical equipment, shall be painted orange.

3.1.3. <u>Audible Noise Levels</u>. Audible noise emitted by the equipment shall not exceed 84 dB at the operator's work position nor at any other point at the distance of 3 feet from the equipment, as measured on the A weighted scale. Measurement shall be taken at the operator's work position and at each corner and at equidistant intervals of not more than three feet along 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 highest noise level emitted from the surface/comer at herein specified location or distance from the equipment. Exterior noise levels shall not exceed 84 dB. The compartments housing the main pumps are exempt. If noise levels inside the pump compartments exceed 84dB, safety signs shall be posted in accordance with ANSI Z535.4.

3.1.4. <u>Hazardous Material Exclusions</u>. Supplies 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 Receiving Activity Point of Contact. Hazardous materials not needed for this project are prohibited. Definitions of hazardous materials are specified in the latest version, including revisions adopted during the term of the contract, of FED-STD-313D. 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) are prohibited. Nickel Metal Hydride and lithium batteries are permissible for memory backup. Class I Ozone

Depleting Substances as defined in 40 CFR 82 shall not be used in the performance of this contract, or be provided as part of the equipment. Exceptions to the prohibition of these materials must be referred to the Contracting Officer in writing, for consideration within 90 days after contract award and prior to any work being performed.

3.1.4.1. 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. A label plate containing the PCB certification information shall be permanently affixed to the equipment.

3.1.4.2. Environmental Protection. The equipment shall not emit materials hazardous to the ecological system, as prescribed by federal, state and local statutes in effect at point of installation, under the operating, service, transportation and storage conditions described herein.

3.1.5. Lubrication. All bearings except sealed-for-life-and self-lubricating types, mating gears and sliding parts shall be provided with means for lubrication. The reservoirs of splash type systems shall be fitted with oil level sight gauges. Automatic force-feeds and manually operated forces feed systems shall be supplied with a filter. Manually operated systems shall have control handles mounted in an accessible location convenient to the operator. A11 oil holes grease fittings and filler caps shall be easily accessible.

3.1.6. Informational Plates. The following informational plates shall be engraved on wear and corrosion resistant metal, permanently affixed to the equipment in conspicuous locations.

3.1.6.1. PCB Label Plate. A label plate stating the PCB compliance shall be affixed to the portable pump station enclosure.

3.1.6.2. Lubrication Plate. A lubrication plate shall be securely attached to each free standing component consisting of or housing equipment requiring lubrication. The following information shall be on the plate:

(1) Points of application

(2) Service interval

(3) Type of lubricant

(4) Viscosity

(5) Federal or Military Specification Number (if available)

3.1.6.3. Identification Plate. The following information shall be on the plate:

(1) Nomenclature

(2) Contractor's Name

(3) Manufacturer's Model Designation

(4) Manufacturer's Serial Number

(5) Electrical Utilities (Volts, HP, Amps, Frequency, Phases, etc.)

(6) Other Utilities (GPM, CFM, PSI, etc.), as applicable

(7) Contract Number

(8) Date of Manufacture

3.1.6.4. <u>Identification Marking Of Military Property</u>. An Item Unique Identification Marking (IUID) shall be provided with the machine in accordance with MIL-STD-130N and all applicable documents within the standard with Machine Readable Information (MRI) for item identification marking and automatic data capture. The application of Human Readable Information (HRI) shall be used in combination with MRI and free text.

3.1.7. <u>Controls</u>. All operator controls, instrumentation and indicators shall be mounted in locations convenient to operating personnel. All such devices shall be clearly and legibly marked for function and identification. Each control shall be fitted with suitable handles, pushbuttons, or control knobs, as applicable.

3.1.8. <u>Electrical Design</u>. The MSWF system shall each be designed to operate on a single electric service of 460 volts, ±10%, 3 phase, 60Hz, 3-wire, with a separate ground wire. The electrical design shall conform to NFPA 70, NFPA 79, NEMA ICS 7, and other requirements specified herein. Each pump shall be provided with a separate electric drive. The electrical systems shall be designed to allow for the simultaneous operation of all equipment. Enclosures for control panels and auxiliary devices shall be NEMA type 4X as defined by NEMA Standards Publication Number 250, safety disconnect switches shall be NEMA 3R, unless otherwise noted. The enclosures shall be designed with appropriate heating and cooling accessories to prevent internal condensation and maintain temperatures suitable for longevity of the electrical components housed by the enclosure. Electrical components for the system shall be industrial duty and located so they are easily accessible for inspection and maintenance. All electrical equipment housed in the portable pump station enclosure, and the hose storage enclosure shall be suitable for use in an environment with the chemicals described in Attachment A. All replaceable parts shall be manufactured to definite standards, tolerances and clearances in order that any such parts of a particular type or model can be replaced or adjusted without modification of the equipment. All control panels shall maintain the clearance requirements of NFPA 79 section 11.5.

3.1.8.1. <u>Wiring</u>. The wiring system, with all of its associated hardware, fittings, and devices, shall be in accordance with NFPA 70 and 79. Unless otherwise specified, interconnecting wiring shall be of any construction complying with NFPA 70 Table 310.104(A) "Conductor Applications and Insulations Rated 600 Volts", except for those

types containing asbestos in the insulation or outer covering. Aluminum conductors and connectors shall not be used. All conductors connected to or routed above resistors shall be type SRML or equivalent. Motor branch circuit conductors shall be sized as to have an ampacity not less than 150% of the motor full load current rating. Conductor selections shall be selected based on maximum ambient temperature. Raceways shall be ferrous rigid metal conduit; where flexible connections are necessary, liquid-tight flexible metal conduit shall be used. Control panels shall not be used as raceways for conductors not terminating within the panel. A separate grounding wire, sized in accordance with NFPA 70 Section 250.122 "Size of Equipment Grounding Conductors", shall be routed with all ungrounded conductors. All conductors, except for encoder conductors (if applicable), shall terminate on terminal blocks; there shall be no splices. All wiring shall be numbered or tagged at all connection points. Fittings and boxes shall have threaded bosses for connection of cable terminations. All unused conduit openings shall be plugged.

3.1.8.2. <u>Electrical Connections</u>. All electrical connections within the equipment shall be complete and shall be made via terminals on the components, terminal/circuit boards and bussing. In no instance shall splicing of wiring between terminals be permitted in the construction nor the repair of the equipment. Connections/Terminals shall be adequately supported and spaced without dependence upon the wiring in the components and braced as necessary to assure withstanding the distortion forces associated with available short-circuit currents. Proper identification of wiring, bussing, terminals and circuits for function, polarity, phasing, etc. shall be adhered to throughout the equipment. Identification shall be in the form of wire markers, color-coding, permanently engraved plates, or permanent markings on the devices. Adequate spacing shall be maintained throughout to avoid excessive bending of cabling and wiring, to maintain adequate separation and creepage distances between electrical potentials and between these potentials and ground, and to permit ease in connecting and disconnecting wiring and cabling during troubleshooting and repair. In no instance shall clearances and creepage distances be less than those prescribed under NEMA ICS 1.

3.1.8.3. <u>Grounding</u>. Exposed, non-current carrying metal parts on the equipment shall be maintained at common, zero ground potential. None of the primary circuits in the equipment shall be connected to ground. A ground stud or lug on the equipment shall provide means for grounding the equipment for safety to personnel. A NEMA approved grounding plug that effectively grounds the equipment shall be acceptable for cord connected equipment.

3.1.8.4. <u>Solid–State Components</u>. Solid-state design shall be employed throughout for electronic components. The use of selenium and other similar aging devices shall be permitted only in the application of voltage surge protection to the other solid-state components. Each solid-state device shall be selected and installed to have characteristics

and withstand ratings comparable with its intended function and application in assuring long life and reliability. Solid-state components shall not be adversely affected when subjected to radiated and conducted power line transients and surges typically experienced in a production type, industrial environment. Series and parallel connections of solid-state devices without forced sharing circuitry for voltage and current respectively shall not be permitted.

3.1.8.5. Safety Disconnect, Portable Pump Station Enclosure. A Square D class 3110, or equivalent, safety disconnect switch (non-fuse, NEMA 4X, Stainless Steel) serving to interrupt all electrical power provided to the MSWF system shall be provided. The safety disconnect is to be securely bolted to the exterior of the Portable Pump Station Enclosure. Panel mounted cam-lock connectors, black (male) # E1016-1600S, red (male) #1016-1602S, blue (Male) #E1016-1612S, and green (female) #1016-1635S, shall be provided on the exterior surface to power the system and to connect the separate ground wire. The safety disconnect shall have a metal handle, means of being pad locked in the off position, clearly labeled, be visible, unobstructed by doors in the open position, and accessible to personnel.

3.1.8.6. Lighting Transformer Disconnect, Portable Pump Station Enclosure. Provide an electrical disconnect, with lockout feature, as the isolation means for the transformer supplying the electrical outlets, lighting, and the MSWF system's ancillary equipment. It shall feed 460 VAC to the primary side of the transformer directly from the load side of the main power disconnect. The disconnect switch shall provide overload and short circuit protection for the downstream transformer. The disconnect switch shall be wall mounted near the lighting transformer.

3.1.8.7. Lighting Transformer Disconnect, Hose Storage Enclosure. A square D class 3110, or equivalent, NEMA 4X stainless steel safety disconnect switch serving to interrupt all electrical power provided to the Hose Storage Enclosure. The disconnect switch shall provide overload and short circuit protection for the downstream transformer. The disconnect switch is to be securely bolted to the exterior of the Hose Storage Enclosure. A panel mounted connector, Integro 4M20 or equal 440V 30Amp 4 Pin, shall be provided on the exterior surface to power the Hose Storage Enclosure lighting transformer. The safety disconnect shall have a metal handle, means of being pad locked in the off position, clearly labeled, be visible, unobstructed by doors in the open position, and accessible to dock personnel.

3.1.8.8. Energy Isolation Devices. The equipment shall be provided with energy isolation devices (e.g. power switches, safety devices, circuit breakers, valves) that protect personnel from the release of hazardous energy. The devices shall be designed and manufactured such that they can be padlocked in the OFF position. This includes both mechanical and electrical devices. An energy isolation device shall be installed as the first energy control

device on all major components of the system such that the component can be isolated at the component level.

3.1.8.9. <u>Motors</u>. The MSWF system motors shall conform to NEMA MG 1. Main pump motors shall be AC single speed, continuous duty and inverter duty type. The motors shall be a minimum of 15 HP, 60 Hertz, 3 Phase, 460 Volt, Power Factor 91. All motor enclosures shall be totally enclosed non-ventilated (TENV). Motors shall be equipped with permanently lubricated and sealed type ball bearings. Motors shall be equipped with thermal trip type over-temperature protection. The temperature sensors shall be of the automatic resetting type and installed integral to the motor windings. Automatic resetting shall not result in motor energization without operator intervention. Activation of any integral motor over-temperature device shall energize (steady) a red fault warning light on the operator console. The red indicating fault light shall remain energized until the over-temperature device resets and is acknowledged by the operator.

3.1.8.10. <u>Lighting Transformer, Portable Pump Station Enclosure</u>. A transformer is to be used to convert the incoming 460V power supplied to 120V/1φ, appropriately sized for all lighting, outlet and heating circuits. The transformer shall be wall mounted in a NEMA 3R enclosure.

3.1.8.11. <u>Lighting Transformer, Hose Storage Enclosure</u>. A transformer is to be used to convert the incoming 460V power supplied to 120V/1φ, 5000VA minimum, for lighting and outlet circuits. The transformer shall be wall mounted in a NEMA 3R enclosure.

3.1.8.12. <u>Panelboard 120V, Portable Pump Station Enclosure</u>. The 120V panelboard shall be a NEMA 3R type enclosure with not less than four (4) spare circuit breakers and a main breaker. Single pole breakers shall be full module size; two poles shall not be installed in a single module. Multi-pole breakers shall be of the common trip type. Breakers shall be the thermal magnetic type. Breakers shall be the bolt-in type (i.e., bolted to the current-carrying bus), plug-in units are not acceptable. Lighting and outlet breakers shall be 20A Arc Fault type breakers.

3.1.8.13. <u>Panelboard 120V, Hose Storage Enclosure</u>. The 120V Panelboard shall be a NEMA 3R type enclosure with not less than four (4) spare circuit breakers and a main breaker. Single pole breakers shall be full module size; two poles shall not be installed in a single module. Multi-pole breakers shall be of the common trip type. Breakers shall be the thermal magnetic type. Breakers shall be the bolt-in type (i.e., bolted to the current-carrying bus), plug-in units are not acceptable. Breakers shall be 20A Arc Fault type breakers.

3.1.8.14. <u>Pump Controls</u>.

3.1.8.14.1. <u>Motor Speed Control</u>. Each pump motor shall have a variable speed controller. Each pump motor (4 each) shall be controlled in both a NORMAL and

BYPASS mode. Operator interface pads (key pads) shall be remotely mounted to the front of the Motor Power Panel to provide access to variable speed drives without the need to open panel doors. The power circuitry for both the NORMAL and BYPASS modes of operation shall be housed in the same enclosure.

3.1.8.14.1.1. <u>NORMAL Mode</u>. The NORMAL mode shall allow each pump motor to be operated with a continuously variable speed from zero RPM to full rated speed using an electronic motor controller fed from its corresponding pump breaker. The electronic motor controller shall be able to be operated remotely from the System Control Panel. Each controller shall include as a minimum: electronic instantaneous over-current protection, under-voltage protection, DC bus overvoltage protection, and the capability to withstand output line-to-line shorts without component failure.

3.1.8.14.1.2. <u>BYPASS Mode</u>. The BYPASS mode shall allow the electronic motor controller to be removed from the input circuit of the corresponding motor and allow incoming power from the corresponding pump breaker to be applied directly to the input of the motor as a backup means to run each pump motor in case of the electronic motor controller failure. This operation shall be accomplished using contactors that are remotely operated from the System Controller Panel.

3.1.8.14.2. <u>Pump Breakers</u>. Pump motors shall be protected by with overload and short circuit protection.

3.1.8.14.3. <u>Motor Power Panel</u>. Provide a single enclosure housing lockable motor disconnect switches (one for each pump circuit), contactors, variable speed drives, control power transformer and other devices required that operate at or above 250V. Contactors shall have renewable contacts. The use of definite purpose contactors is prohibited.

3.1.8.14.4. <u>Harmonics Protection</u>. Minimum harmonics protection shall consist of a reactor connected in series with each controller's line (input) terminals. All reactors shall be rated for continuous duty operation based upon motor nameplate amperes and shall be designed for 60 HZ operation.

3.1.8.14.5. <u>Phase Failure Relay</u>. The equipment shall be protected with a Square D, 460 VAC, 3 phase, 60 HZ, class 8430, type MPDV29, phase failure relay or equivalent.

3.1.8.15. <u>System Controls</u>.

3.1.8.15.1. <u>Control Circuits</u>. Control circuits shall operate on circuits of 120 volts or less. All control circuits shall be fed from a single phase, air cooled, double wound transformer with a grounded metal screen between the primary and secondary windings of the transformer. The transformer shall be located in the Motor Power Panel.

3.1.8.15.2. <u>System Control Panel</u>. A single enclosure housing logic relays, pushbuttons, level meters, pump differential pressure meters and light indicators shall be used to show

status of each pump controller and motor and allow operation of each pump electronic motor controller to start, stop and vary speed of each pump motor independently. The manual controls will require the operator to push buttons and/or turn switches to initiate each pumping stage operation. Each pump shall have its own controls for stopping, starting and controlling pump speed. All controls shall be located in such a manner as to afford operator safe ergonomic access. All relays inside the control panel shall have an indicator light on the relay to aid in trouble shooting.

3.1.8.15.2.1. <u>Safety Interlocks</u>. Safety interlocks shall be included that will place all pump motors in an OFF condition upon indication of the following:

a. Tank high level

b. Pump motor thermal overload

c. Phase failure

d. Emergency stop button pressed

e. Low pump level (dry suction)

3.1.8.15.2.2. <u>Indicators and Controls</u>. The control panel shall include, but not be limited to, the following indicators and controls:

a. RED Phase Failure indicator

b. WHITE Power Available indicator

c. Alarm Horn

d. Horn Silence pushbutton

e. Push To Test switch to test indicators and horn

f. Discharge Manifold Temperature meter

g. Discharge Manifold Pressure meter

h. For each pump, the following shall be included:

(1) Differential Pressure meter

(2) RED Drive Fault indicator

(3) RED Thermal Overload/Reset indicating pushbutton

(4) BLUE Pump Run indicator

(5) START/INCREASE pushbutton

(6) STOP/DECREASE pushbutton

(7) NORMAL/BYPASS switch

i. For each tank, the following shall be included:

(1) Tank Level meter

(2) RED 90% Full indicator

(3) AMBER 80% Full indicator

(4) RED Tank Leak indicator

3.1.8.16. <u>Emergency Stop Buttons</u>. The MSWF system shall be provided with emergency stop buttons (switches) at the operator's station on the control panel and near each end of the Portable Pump Station Enclosure on the exterior side with the hose connections. 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 cause all operations or functions to immediately stop or cease. Emergency Stop Buttons shall not restart the equipment after resetting. The restarting of the equipment after losing power or resetting the emergency stop button shall be possible only by a deliberate operator action.

3.1.8.17. <u>Electrical Outlets</u>. The Portable Pump Station Enclosure shall have three (3) 120 VAC, single phase, 20 amp, ground fault circuit interrupter (GFCI) duplex receptacles inside the operator area. There shall be one near each end, and one near the center of the operator area. The Hose Storage Enclosure shall also have two (2) duplex GFCI receptacles, one at each end. All electrical outlets are to be weatherproof.

3.1.8.18. <u>Lighting</u>. All lighting shall be enclosed in Explosion Proof and Weatherproof fixtures approved by the Underwriters' Laboratories for use in Class I Division 2 Group B environments. The lamps shall be LED and provide illumination of at least 10 foot-candles. The lights shall be connected to weatherproof single pole switches. The switch for the Portable Pump Station Enclosure shall be located adjacent to the exterior doors of the operating station. A thee way switch shall be provided at each end of the Hose Storage Enclosure.

3.1.8.19. <u>Nameplates</u>. Nameplates shall be provided for all electrical control equipment such as motors, switches, brakes, transformers, etc. As a minimum, each nameplate shall identify the associated function and system designation. Nameplates shall be deeply etched with letters contrasting with background color. Each electrical component shall retain all nameplates, markings, etc provided by the original manufacturer.

3.1.8.20. <u>Initial Voltage Verification (IVV) Connector</u>. All electrical enclosures that contain an accessible voltage of 250 volts or greater, and where the power is not easily disconnected by external means, must have an accessible connector for verifying the voltage without opening the enclosure. Examples of enclosures are safety switches, control panels, disconnects and power transformers. These connectors shall provide IVV test points with no intended load.

3.1.8.20.1. <u>Location of IVV Connector</u>. The IVV connector shall be located in accessible areas on enclosures as follows:

a. Safety Switches – Load side portion of the switch on the side of the panel.

b. Control Panels – Side of the enclosure without interference with the internal components.

c. Transformers – Side of the enclosure without interference with the internal components, and without violation of manufacturer's specification.

3.1.8.20.2. <u>IVV Connector Part Numbers</u>. The connector receptacle shall conform to SAE AS3102A part number MS3102 A 20-3SA. The dust cap with chain shall conform to SAE AS25043A part number MS25043-20-DA. Recommended source part numbers meeting these requirements are Amphenol part number 97-3102A-20-3S, and Amphenol part number 97-60-20, respectively. Recommended flange gasket is Amphenol part number 10-040450-020.

3.1.8.20.3. <u>Installation of IVV Connector</u>. The IVV connector and cap shall be secured to the enclosure using four corrosion resistant #4-40 screws, washers, star washers, and lock nuts. The IVV connector's three socket contacts shall be wired to the load side of the disconnect switch, main fuses, or primary side of the power transformer, as applicable. The wires for the connections shall be soldered at the IVV connector with #12 THHN and sleeved, to prevent exceeding the circular mil rating of the lugs. The NEMA rating of the enclosure shall be maintained by measures such as installing a gasket. The connector shell shall be grounded to the enclosure. A corrosion resistant #4-40 ground connection lug, external to the enclosure, shall be installed adjacent to the connector socket, and identified with a ground symbol.

3.1.8.20.4. <u>Identification of IVV Connector</u>. A corrosion resistant label plate red in color and indicating the expected voltage, and the words "TO BE USED FOR I.V.V. TEST ONLY" shall be installed adjacent to the IVV connector.

3.1.8.21. <u>Tank to Portable Pump Station Enclosure Interconnections</u>.

3.1.8.21.1. <u>Interconnecting Power Cables</u>. Power cables shall be constructed with insulation suitable for continuous outdoor use in the working environment described herein. The cables' end connectors must be compatible with the Integro 3M20-3F20 type for weather tight connections. The following power cable sets shall be provided:

3.1.8.21.1.1. Six (6) 50 foot power cables - Integro 11384-01-050 (3M20-3F20 on 12/3), or equal

3.1.8.21.1.2. Six (6) 25 foot power cables - Integro 11384-01-025 (3M20-3F20 on 12/3), or equal

3.1.8.21.2. <u>Interconnecting Signal Cables</u>. Signal cables shall be provided for tank levels and alarms. Cables shall be constructed with insulation suitable for continuous outdoor use in the working environment described herein. Cables shall have appropriate SAE AS3102A plug style connectors with chained dust caps on each end. The following signal cable sets shall be provided:

3.1.8.21.2.1. Six (6) 50 foot signal cables

3.1.8.21.2.2. Six (6) 25 foot signal cables

3.1.8.21.2.3. A separate set of three (3) 200 foot signal cables shall be provided in addition to the twelve cables that are to be included with each MSWF unit. These cables shall three cables shall not be included with each MSWF unit.

3.1.8.21.3. <u>Power Cable Connections</u>. Power cable connections to the Portable Pump Station Enclosure shall be made at an appropriately sized stainless steel junction box housing four (4) female receptacles, Integro 11086 (3F20) or equal, that are shrouded against water intrusion. The connection box shall be securely bolted to the exterior of the Portable Pump Station Enclosure near the Safety Disconnect. Power cable connections at the MSWF tanks shall be panel mounted plugs, Integro 11249 (3M20) or equal, shrouded against water intrusion.

3.1.8.21.4. <u>Signal Cable Connection Boxes</u>. Signal cable connections to the Portable Pump Station Enclosure shall be made at an appropriately sized NEMA 4X stainless steel junction box housing four (4) SAE AS3102A socket style receptacles with SAE AS25043A style caps on lanyards. The connection box shall be securely bolted to the exterior of the Portable Pump Station Enclosure near the Safety Disconnect. Signal cable connections at the MSWF tanks shall also be panel mounted SAE AS3102A socket style receptacles with SAE AS25043A style caps on lanyards.

3.1.9. <u>Interchangeability</u>. All replaceable parts shall be manufactured to definite standards, tolerances and clearances in order that any such parts of a particular type or model can be replaced or adjusted without modification of the equipment.

3.2. <u>Construction</u>. The equipment shall be constructed of parts, which are new, without defects and free of repair. The equipment shall be complete so that when connected to the specified utilities it can be used for any operation for which it is being purchased. The equipment shall be devoid of any defects or characteristics that will preclude conformance with any of the requirements under paragraph 3, and inspections and tests under paragraph 4.

3.2.1. <u>Casting and Forgings</u>. All 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 forging for reclaiming any parts of the equipment.

3.2.2. <u>Welding Brazing or Soldering</u>. Welding, brazing or soldering 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. Solder connections shall show evidence of good bonding in metal-to-metal contact. Cold solder joints, incomplete joining of solder and metal, excess or insufficient solder or damaged insulation shall be considered reason for rejection of the equipment. Any loose, spattered solder, flux, metal chips, insulation scrap or other foreign material shall be removed from the equipment. Flux for soldering shall be rosin or rosin and alcohol. No acid, acid salts or acid core solder shall be used in preparation for soldering of electrical connections.

3.2.3. <u>Fastening Devices</u>. All screws, pins, bolts, and similar internal and external parts shall be installed with means for preventing change of tightness. Such parts subject to removal or adjustment shall not be swaged, peened, staked or otherwise permanently installed. All fastening devices shall be tightened to torque limits such as established by the manufacturer's standard for tightening to preclude loosening during normal operation or vibration.

3.2.4. <u>Surfaces</u>. All surfaces of castings, forging, molded parts, stampings and welded parts shall be cleaned and free from sand, dirt, fins, spurs, flux or other harmful or extraneous materials. External surfaces shall be smooth, and all edges shall be either rounded or beveled unless sharpness is required to perform a function.

3.2.5. <u>Corrosion Control</u>. All system components shall be protected against corrosion and deterioration by appropriate material selection, application of coatings and sealants. Lead based or chromium based paints are prohibited. Painting shall result in a highly wear-resistant finish, which guarantees continued protection to the surfaces covered against the specified environment under all service conditions. Exposed ferrous parts such as screws, bolts, nuts, washers, etc., shall resist corrosion in a salt-laden, moist, variable temperature atmosphere. Protection such as cadmium or chrome plating, galvanizing or other electrical/chemical process, or stainless steel is acceptable. Aluminum parts shall be anodized or chemically treated followed by two coats of weather-resistant exterior paint. Dissimilar metals shall not be used in direct contact with each other without suitable means for preventing electrolytic corrosion. Steel parts shall be painted with two coats of primer and two coats of weather-resistant exterior paint. The roof of the enclosures shall have their seams treated with waterproofing compound. The interior of the enclosures shall be white or near white for visibility purposes.

3.2.6. <u>Threads</u>. Threads on all threaded fasteners shall conform to Federal Standard H28A.

3.2.7. <u>Gauges</u>. All gauges shall be suitable for use with chemicals identified in Attachment A. Gauges shall be designed for re-calibration. Graduations shall be permanently marked on

a contrasting, non-glare surface. Gauge graduations shall represent not more than the movements listed below.

3.2.7.1. Pressure gauges. Pressure gauges shall be liquid filled to dampen dial movement. Pressure gauge readout shall be in pounds per square inch (PSI) only, with a range of 0 to 200 PSI. Major graduations shall be in 20 PSI increments, and minor graduations in 2 PSI increments.

3.2.7.2. Temperature gauges. Temperature gauges shall be installed using thermowells. Temperature gauge readout shall be in Fahrenheit degrees only, with a range of 0°F to 200°F. Major graduations shall be in 20°F increments, and minor graduations in 2°F increments.

3.2.7.3. Storage Tank Fluid Level Gauges. Storage tank fluid level gauges shall readout in 100 gallon increments.

3.2.7.4. Digital Readouts. All digital readouts shall display data in illuminated figures clearly legible at a distance of 10 feet and that give direct horizontal readings without requiring any calculation or interpolation. Each digit of the readout display shall be of the in-line type.

3.2.8. Ventilation. The portable pump station enclosure shall be adequately ventilated to prevent damage from overheating when utilized under the ambient and operating conditions specified herein. The ventilation fans shall be thermostatically controlled, override capable by a single switch in the operator's station.

3.2.9. Handling Devices.

3.2.9.1. Lugs and Lifting Eyes. Where lugs or lifting eyes are specified, they shall be arranged with the vertical center of gravity for safe handling and transport by crane. There shall be four lugs or lifting eyes located no lower than the top of the unit, mounted on a structural frame, which is attached to the base of the unit. The equipment when suspended shall hang perpendicular level within 5 degrees. The arrangement shall provide a stable and balanced lift with a load safety factor of at least five times the total weight of the equipment. All steel lugs and lifting eyes and associated welding shall be non-destructive testing (NDT) inspected with magnetic particle testing in accordance with NAVSEA technical publication T9074-AS-GIB-010/271, and acceptance criteria shall be in accordance with MIL-STD-2035A. Testing documentation shall be provided with the technical documentation. All fillet welds shall be sized per MIL-STD-1628. Joint efficiency shall be 100%. The gross weight rating (GWR) shall be painted beside each lifting point. Certification is required for load test of each lug and lifting eye at 200% of working load rating for 10 minute intervals.

3.3. Additional Requirements.

3.3.1. <u>OSHA Approved Certification</u>. The equipment installation and its component parts shall be in compliance with the applicable OSHA regulations and be, in accordance with CFR Title 29, Chapter XVII, Part 1910 and installed in accordance with NFPA 70 requirements. 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 a signed written Manufacturer's Certification that equipment has been manufactured and installed to OSHA CFR 1910.399 (per definition of acceptable).

3.3.2. <u>Technical Manuals</u>. Technical manuals, written in the English language, using font size of at least 10 points shall be furnished. Each unit shall require four (4) identical sets of technical data. All technical material including fold up schematics and drawings must be bound or held together by loose-leaf binders. Clear loose-leaf sheet protectors with an opening at top only are acceptable for inserting fold up schematics and drawings in a loose-leaf binder. The title block to each schematic and drawing must be showing and readable without unfolding or removing from a manual. The technical data shall include, but not be limited to the following:

3.3.2.1. Operating instructions with operating procedure checklist

3.3.2.2. Maintenance instructions including preventive and corrective maintenance procedures and checklists

3.3.2.3. Electrical schematics

3.3.2.4. Mechanical schematics

3.3.2.5. Detailed parts list including part numbers

3.3.2.6. Recommended spare parts list

3.3.2.7. Lifting drawings and instructions

3.3.2.8. NDT certification for lugs, lifting eyes and associated welds

3.3.3. <u>Preliminary Drawings (35%)</u>. Within forty-five (45) days after award of the contract, the contractor shall provide preliminary drawings, with design at least 35% complete, for review and approval by the Government before production begins. The contractor shall provide four identical sets of the advance engineering package to the receiving activity point of contact RAPOC. The preliminary drawings shall include, but not be limited to, piping and electrical schematics, complete equipment layout, and operators control panel layout. Approval shall be provided by the Government within 10 days after receipt of the preliminary drawings. Drawings shall be delivered in AutoCAD and PDF format.

3.3.4. <u>Preliminary Drawings (60%)</u>. Within forty-five (45) days after award submission of the first set of preliminary drawings, the contractor shall provide preliminary drawings, with design at least 60% complete, for review and approval by the Government before production begins. The contractor shall provide four identical sets of the advance engineering package to the receiving activity point of contact RAPOC. The preliminary drawings shall include, but not be limited to, piping and electrical schematics, complete equipment layout, and operators control panel layout. Approval shall be provided by the Government within 10 days after receipt of the preliminary drawings. Drawings shall be delivered in AutoCAD and PDF format.

3.3.5. <u>Final Drawings</u>. Within forty-five (45) days after award submission of the second set of preliminary drawings, the contractor shall provide final drawings, with design 100% complete, for review and approval by the Government before production begins. The contractor shall provide four identical sets of the advance engineering package to the receiving activity point of contact RAPOC. The final drawings shall include, but not be limited to, piping and electrical schematics, complete equipment layout, and operators control panel layout. Approval shall be provided by the Government within 10 days after receipt of the preliminary drawings. Drawings shall be delivered in AutoCAD and PDF format.

3.4. <u>Utilities</u>. The equipment shall be designed and constructed to be complete for operation on the following available utilities:

Electric - Single service 460 VAC (-/+ 10%), 3 phase, 60 Hertz

Compressed Air - 90 PSI

3.5. <u>System Components</u>. The MSWF System shall be comprised of four (4) 5,000 gallon double wall tanks, four (4) variable speed pumps with individual motors and controllers, valves, manifolds with hose connections, flow indicators, water supply connection with a water meter and back flow preventer, service air connections for blow down and positive displacement diaphragm pump for emptying and cleaning tanks. The following drawings are provided as guidance to assist in system design and development, except MSWF SK-02, which will be adhered to for the fabrication of the hull fittings.

MSWF SK-01 System/Label Schematic

MSWF SK-02 Hull fittings

MSWF SK-03 Fwd and Aft Manifolds

MSWF SK-04 Return Manifold

MSWF SK-05 Portable Pump Station Enclosure

3.5.1. <u>Tanks</u>. The system requires a quantity of four (4) identical 5,000 gallon vented tanks, meeting the requirements of ASTM D1998. Tank overall dimensions shall not exceed 102" diameter and 216" height, excluding fittings. Tanks shall be upright, double wall, storage tank assemblies. The assembly for each tank shall consist of one cylindrical inner primary tank and one blended form outer secondary tank. Tanks shall be molded in one-piece seamless construction. Tanks shall be designed to prevent rainwater from entering either the inner or outer tanks. Each tank shall have tie downs to suit seismic zone 4 conditions. The outer secondary tank shall provide a minimum of 115% of the inner tank's capacity and shall comply with 40 CFR 264.193. All connections to the tanks shall be mechanical to allow break down and re-assembly. Each hose connection shall include cleanliness caps or plugs attached by lanyard.

3.5.1.1. <u>Lower Tank Connections</u>. Each tank shall include three (3) lower connections, located a minimum of 90° apart. Each connection shall have 3" female NPT threads, pipe nipple, ball valve, second pipe nipple, and hose connector.

3.5.1.2. <u>Upper Tank Connections</u>. Each tank shall include five (5) upper connections on the tank top. Each connection shall have 3" female NPT threads, pipe nipple, and female hose connector.

3.5.1.3. <u>Tank Vents</u>. Each tank shall have a top U-vent sized to vent air at a rate of at least 48 CFM. The vents shall be designed to prevent rainwater and debris from entering the tanks.

3.5.1.4. <u>Tank Material</u>. Tank material shall be High Density Polyethylene, suitable to contain materials identified in Attachment A. The tank shall provide safe storage of the materials listed in Attachment A without tank and tank fitting degradation.

3.5.1.5. <u>Tank Transport Requirements</u>. Tanks shall be designed for transport, while empty, on their sides to allow over the road movement aboard a standard flatbed trailer, without special DOT permits. Each tank shall have lift points at the top and sides to allow crane lifts for movement in both the vertical and horizontal positions, as well as a safe means of both standing and tipping, in preparation for use or transport respectively. Each tank shall have tie down points for shipping. All fixtures, such as cradles, necessary for shipping each empty tank on its side shall be included.

3.5.1.6. <u>Tank Heating System</u>. Tanks shall have a heating and insulation system to allow MSWF operation in below freezing temperatures. The heating system shall be able to maintain tank contents at a temperature 70°F above the ambient temperature, for effluent temperatures up to 80°F, and ambient temperatures down to 10°F, without damaging or weakening the tank. Effluent types shall include the materials listed in Attachment A and plain water. Each tank's heating system shall be independent of the other tanks, and

powered by 110VAC from the Portable Pump Station Enclosure via the power cables specified herein.

3.5.1.6.1. **Tank Heating System Controls**. The heating system controls shall allow user setting of the effluent's maintenance temperature across a range of at least 35°F to 80°F. The heating system controls shall monitor the temperature of any heating elements applied directly to the tank to prevent damaging of the tank material by overheating.

3.5.1.6.2. **Heating System Control Enclosure**. Heating system controls shall be housed in a watertight enclosures meeting the requirements of NEMA 4, on each tank. The enclosure shall have an electrical wiring diagram of the heating system posted on the inside of the enclosure's cover. All electrical connections shall be labeled.

3.5.1.6.3. **Temperature Gauges**. Each tank shall have a local temperature gauge for monitoring the temperature of the fluid in the inner tank.

3.5.1.6.4. **Tank Insulation**. Each tank shall be wrapped in insulating material to minimize energy consumption while maintaining the effluent temperature. The insulation shall be weatherproof or coated with a weatherproof material so that it will not retain moisture. The tank insulation shall not interfere with, or be damaged while meeting the requirements defined in the section "Tank Transport Requirements".

3.5.1.7. **Access Hatch**. Each tank shall have a watertight access hatch suitable for manned entrance during inspection, maintenance, and cleaning.

3.5.1.8. **Tank Level Indicators**. Remote tank level indication is required at the system operator's station. Tank level indicators shall be transducer type with alarm/warning at the operator's station, with readout in 100 gallon increments. A light shall illuminate at the tank and at the operators control station to indicate the tank is at 80% full. When the tank is 90% full an audible alarm must sound, a control circuit shall shut pumps off, and tank full/pump shut down light shall illuminate at the operator's station.

3.5.1.9. **Automatic Leak Detection**. The tanks shall have a leak detection capability, which shall sense the presence of effluent in the tank's secondary containment. Indication of leakage shall be audible at the tank and visual at the operator's station.

3.5.1.10. **Tank Labeling**. Labels for the four tanks are required. Each tank shall be labeled with 6" block lettering, every 90° on the outside of the tanks, 4 to 6 feet above ground level. Tanks shall also be labeled with 3" lettering on the top.

3.5.1.10.1. One (1) tank shall be labeled "Mix Tank"

3.5.1.10.2. One (1) tank shall be labeled "Rinse Tank"

3.5.1.10.3. Two (2) tanks shall be labeled "Waste Tank"

3.5.1.11. **Covers**. The tanks shall have a fabric cover to protect the tanks from weather and ultraviolet light for system outdoor storage.

3.5.2. **Main Pumps**. The MSWF system shall have four main pumps rated for continuous duty. Pumps shall be able to be run individually or in combination at varying speeds, controlled by the operator. Each pump shall connect to the suction header with a 3” line. The discharge shall be at least 2-1/2”. Each pump shall have ball valve isolations on both the suction and discharge sides. A check valve downstream of each pump discharge isolation valve is also required. Each main pump shall be 3” X 2-1/2” centrifugal pumps close coupled to an electric motor, rated for flow of 300 GPM @ 144Ft of Head. Pump material and seals shall be suitable for use with chemical described in Attachment A. Pressure transducers or similar means shall be provided to display the differential pressure across each pump’s supply and discharge on the system control panel. Pump automatic shutdown is required for any tank high level, pump low level, and motor thermal overload conditions.

3.5.2.1. **Expansion Joints**. Each main pump shall have Polytetrafluoroethylene (PTFE) lined rubber expansion joints on both the suction and discharge sides of the pumps similar to Proco Products Inc, PN series 231/BT.

3.5.3. **Positive Displacement Pump**. A portable air driven diaphragm positive displacement pump shall be provided. The positive displacement pump shall be used for system clean-up and fluid transfer without power up of the main plant. The positive displacement pump shall be solidly mounted inside the enclosure for use inside the enclosure, but capable of a quick dismount for use outside the enclosure. Air piping with a quick disconnect shall be provided at the positive displacement pump location. The positive displacement pump shall have 2" hose connections. The positive displacement pump shall have the following characteristics:

3.5.3.1. Max fluid working pressure shall be 120 PSI

3.5.3.2. Air pressure operating range shall be 20-120 PSI

3.5.3.3. Max air consumption shall be 175 SCFM

3.5.3.4. Air consumption at 70 PSI and 60 GPM shall be 60 SCFM

3.5.3.5. Max free-flow delivery shall be 150 GPM

3.5.3.6. Max pump speed is 145 CPM

3.5.3.7. Max suction lift is 18 feet

3.5.3.8. Max pump-able solid size is ¼ inch

3.5.3.9. Air inlet size is ½ in NPT

3.5.3.10. Max noise level at 100 PSI and 50 CPM is 90 dB

3.5.3.11. Noise level at 70 PSI and 50 CPM is 84 dB

3.5.4. <u>Piping</u>. All piping, except hoses, shall be made from seamless 70/30 Copper-Nickel, meeting requirements of ASTM B466/B466M. Fixed piping shall not extend beyond the sides of the portable pump station enclosure. Weld joint design shall be selected to minimize internal crevices. Socket weld joints are not acceptable.

3.5.4.1. <u>Minimize Piping Turns</u>. Piping from the discharge of the pumps shall be constructed to minimize the number of 90 degree turns.

3.5.4.2. <u>Cleanliness Plugs and Caps</u>. All cam and groove hose connections, except those on hoses, shall have either a cleanliness plug or cap made for the specific hose connection, on a lanyard.

3.5.4.3. <u>Hose Connector Selection</u>. All hose and hose connections used in the MSWF system shall be chosen typically for the fluid to flow from male fittings to female fittings, unless otherwise specified.

3.5.4.4. <u>Manifold Hose Connection Down Angle</u>. Hose connections shall be angled slightly downward, approximately 15° from horizontal for hoses that run across the ground.

3.5.4.5. <u>Water meter</u>. Water meter shall be a top loaded disc meter, meeting the requirements of AWWA C700, and consisting of three basic components: bronze meter housing, measuring chamber, and permanently sealed register. The register shall read quantity in gallons.

3.5.4.6. <u>Backflow preventer</u>. The backflow preventer shall stop any contamination from entering the potable water supply. It shall be a reduced pressure backflow preventer meeting the requirements of AWWA C511.

3.5.4.7. <u>Service Air Piping</u>. Service air piping shall be in accordance with sheet 12 of SK-05.

3.5.4.8. <u>Sight flow indicators</u>. Sight flow indicators shall be bi-directional, with 2” NPTF inch threaded end connections, Monel bodies, tempered soda lime glass windows, Delrin indicators, and neoprene seals.

3.5.4.9. <u>Ball Valves</u>. Ball isolation valves shall be rated for a minimum of 150 PSI, and shall be NPTF 3 piece, full port threaded, bronze body. They shall be in-line repairable, with adjustable packing gland, blowout proof stem design, premium RPTFE seats and seals suitable for chemical use. Ball valve handles shall have identification lettering clearly engraved and painted in the plastic coated handle on the valve.

3.5.4.10. <u>Relief valve</u>. System relief valve shall be constructed of bronze with a stainless steel spindle, NPTF 3 inch threaded connections, set pressure 125 psi with springs adjustable to 5 psi above or below the set pressure. The relief valve shall be suitable for chemical use. It shall relieve at a rate of 500 GPM at 25% over pressure.

3.5.4.11. <u>Check valves</u>. MSWF system check valves shall be in-line, spring actuated, CVB ball cone, NPT threads for connection. They shall be tight flow shut-off with a straight through flow design and Reinforced Polytetrafluoroethylene (RPTFE) ball cone for chemical resistance. They shall be rated for 400PSI and 350°F. Valve body shall be bronze.

3.5.4.12. <u>Sampling valves</u>. MSWF system sampling valves shall be ¼" monel needle globe valves with compression fittings for ¼" tubing.

3.5.4.13. <u>Flanges</u>. Flanges shall be rated for 150 PSI conforming to ASME/ANSI B16.5.

3.5.4.14. <u>Valve, Pumps, and Manifold Labeling</u>. The schematic, SK-01 sheet 3 provides the valve designations for valve labels. Every pump and manifold, as identified in the sketch, shall have a component label attached and easily visible.

3.5.5. <u>Manifolds</u>. Five distinct manifolds shall be provided with the system in accordance with the details in SK-01 through SK-05.

3.5.5.1. <u>Portable Pump Station Enclosure Piping</u>. The pump suction and discharge manifolds, associated piping, fittings, and the main pumps shall be supported sufficiently inside the enclosure to prevent damage during transport and operation.

3.5.5.2. <u>Manifold Hose Connections</u>. Manifold hose connections shall be 18" apart to allow room for operator to work. The hose connections of the fixed manifolds in the pump station portable enclosure shall be vertically aligned. The main hose connections on the suction and discharge manifolds shall have a slight down angle, approximately 15° from horizontal, to aim the hoses toward the ground relieving stress to the connection as well as making hook-up easier for the mechanic. See MSWF SK-05

3.5.5.3. <u>Manifold Drain Connections</u>. Manifolds shall have drain connections located at a low point, such that all fluid can be removed. At the opposite end of each manifold an air blow down connection shall be installed.

3.5.5.4. <u>Skid Mounted Return Manifold</u>. The return manifold shall be constructed in accordance with sketch MSWF SK-04 and SK-05, and located on its own portable foundation skid, suitable for storage and transport in the portable pump station enclosure. The return manifold shall be sufficiently supported on the skid so it will not be damaged during transport or operation. All piping mechanical connections to the manifold shall be within the footprint of the skid tray. Hose supports to guide the hoses to the ground and prevent stress on the hose connections shall be provided.

3.5.5.4.1. <u>Skid</u>. Entire skid shall be designed to be securely mounted inside the pump enclosure for transport. It must have lift points for both crane and fork lift. The skid shall have a corrosion resistant metal tray, at least 2" deep, to contain all minor leakage of the hose connections and piping. The skid shall have fork lift tine openings. The tine guide

openings shall be 5” x 10” box construction from metal at least ¼” thick, extending across the entire width of the skid. The skid shall have a means of tie down for transport inside the portable pump station enclosure.

3.5.5.5. **Return manifold inlet**. The inlet side (return from ship) shall have six, 2 inch female cam and groove connections for the hoses that return from the ship’s hull connection. The outlet side shall have seven, 3 inch male cam and groove connections. One 3 inch outlet connection shall have an in-line check valve between the manifold isolation and the male cam and groove hose fitting to prevent any backflow. In addition this manifold shall also have two instrumentation taps (one for temperature, the other for pressure), a ¾ inch drain with cap and isolation valve, and ½ inch quick disconnect for service air-in (for manifold blow down). This manifold shall also have a ¼ inch sampling line with Monel globe isolation.

3.5.5.6. **Return and Discharge Manifold Temperature and Pressure Gauges.** The return and discharge manifolds shall have temperature gauges, meeting the requirements of the paragraph entitled “temperature gauges”, and pressure gauges, meeting the requirements of the paragraph entitled “pressure gauges”. The return manifold gauges shall be local to the manifold and the discharge manifold gauges shall be mounted on the operator panel.

3.5.6. **Hoses Assemblies**. All hoses shall be constructed of opaque ultra high molecular weight (UHMW) polyethylene, reinforced with multiple textile plies and dual wire helix to prevent collapse and shall meet the requirements of 33 CFR 154.500.

3.5.6.1. **Hose Assembly End Fittings**. All hose fittings shall be cam and groove type manufactured to CID A-A-59326, Class B, Style 2. Hose fittings from a single brand name/manufacturer shall be used throughout. All hose assemblies shall have one female cam lock end and one male cam lock end. End fittings shall be attached to hose material via crimp style hose via a single specified diameter, elongated sleeve length.

3.5.6.2. **Hose Assembly Identification Tags**. All hoses assemblies shall have a banded individual identification tag attached for reporting the results of the hydrostatic tests. The identification tags shall also include the words “Chemical Hose UIPI 5050-903”.

3.5.6.3. **Hose Assembly Sizes and Quantities**. Lengths and quantities of hose assemblies are as follows:

3.5.6.3.1. 2" hose assemblies

3.5.6.3.1.1. 50 foot length qty: 48

3.5.6.3.1.2. 25 foot length qty: 32

3.5.6.3.1.3. 10 foot length qty: 16

3.5.6.3.2. 3" hose assemblies

3.5.6.3.2.1. 25 foot length qty: 34

3.5.6.3.2.2. 15 foot length qty: 12

3.5.6.3.3. Hose fitting elbows to connect any two hoses of the same size together

3.5.6.3.3.1. 2" 90 degree qty: 24

3.5.6.3.3.2. 2” 45 degree qty: 20

3.5.6.3.3.3. 3" 90 degree qty: 12

3.5.6.3.3.4. 3” 45 degree qty: 12

3.5.6.3.4. Hose fitting reducers

3.5.6.3.4.1. 3 in female to 2 in male - Qty 4

3.5.6.3.4.2. 2 in female to 3 in male - Qty 10

3.5.7. <u>Hose Stands</u>. A hose stand for each manifold hose connection, and for each tank lower hose connection shall be provided. The hose stands shall transition the hose from the connection point to the ground, eliminating stress on the hose connection and the manifold or tank to which the hose is connected. The hose stands shall be stow able in either the portable pump station enclosure or the hose storage enclosure.

3.5.8. <u>MSWF System Enclosures</u>.

3.5.8.1. <u>Portable Pump Station Enclosure</u>. The portable pump station enclosure shall be a weather tight, ventilated intermodal freight container meeting the requirements of ISO 1496-1. The portable pump station enclosure shall have doors on both ends. The portable pump station enclosure shall permanently house the 4 pumps, suction and discharge manifolds, motor controllers, operator’s station, controls, manifold isolations, lighting, 110V electrical outlets, fans, hose connections, and an emergency eye wash/shower station. It shall store, secure and transport the skid mounted return manifold, the hose supports and the forward and aft ship’s portable manifolds.

3.5.8.1.1. <u>General Layout</u>. The portable pump station enclosure shall have access doors at each end and ventilation/cooling fans and louvers for tropical operations. Access for pump/motor maintenance is achieved with two pumps located at each end interconnected with common pump suction and discharge manifolds. One side of the portable pump station enclosure shall have access doors to the operator’s station. The other side shall have the main suction and discharge manifolds and all hose connections/isolations. The inside of the enclosure must be partitioned for the operator’s station to be isolated from the pumping equipment inside the enclosure. This operator's station shall have sound isolation limiting audible noise levels to 84dB or less. All suction and discharge hose connections/isolations shall be located on one side of the enclosure and within the

enclosure boundary. A partition must separate the operator's area from the manifolds/hose connections/isolation valves. The hose connections and manifold isolation valves shall be accessed from outside the enclosure via swing away doors or removable panels. The partitions shall be situated so any maintenance/repair work to the piping system can be accomplished without cutting metal. Access to the hose connections/isolations shall be from outside the enclosure via hinged or removable panel(s) on one side of the enclosure. Access to the pump isolation valves shall be through an access door in the partition between the operator's station and each pump room and through the main enclosure doors at each end of the enclosure.

3.5.8.1.2. <u>Spill Containment</u>. Any leakage or spill from the hose connections and piping housed within the enclosure or any equipment malfunction must be contained by the enclosure. The enclosure must be capable of containing the entire contents of the piping systems housed within the enclosure or a minimum of 250 gallons whichever is greater. Raised, removable metal floor grating installed above the floor pan is required in the operator's area so the operator will not stand directly on any leaking fluid.

3.5.8.1.3. <u>Emergency Shower and Eye Wash</u>. The portable pump station enclosure shall have an emergency shower/eye wash station than meets requirements of ANSI Z358.1, located in an area away from electrical equipment, having a curtain on a track to contain water spray when the shower is operated. The shower and eye wash station shall be fed from the potable water connection upstream of the backflow preventer.

3.5.8.1.4. <u>Main Pump Emergency Stop Buttons</u>. The portable pump station enclosure shall have weatherproof emergency stop buttons located on the hose connection side, one at each end so the pumps can be shut down from outside the enclosure in the event of an emergency. The operator station shall also have an emergency stop button.

3.5.8.2. <u>Hose and Fitting Enclosure</u>. The hose and fitting enclosure shall be a second intermodal freight container meeting the requirements of ISO 1496-1, used for hose and fitting storage and transport. The enclosure shall have a nominal length of 30 feet. Additionally, the hull fittings listed in "Special Equipment" shall be housed and secured for transportation in this enclosure. It shall have doors on each end. It shall have lights consistent with the other enclosure. The hoses and fittings shall be stored on shelves constructed within this enclosure. The shelves shall be designed for easy access, loading and off-loading of the hose assemblies without damaging them. It shall also have walkway through the center.

3.6. <u>Special Equipment</u>. The system requires custom made ship's hull fittings for connection to the Navy vessel. The hull fittings shall be manufactured in accordance with attachment MSWF SK-02. Deviations from the requirements of MSWF SK-02 require prior Government approval. The hull fittings shall be stored securely in the hose and fitting enclosure during

transport. All exposed external threads are to be protected during shipment. Quantities are as follows:

3.6.1. Assy 300 – Qty 1

3.6.2. Assy 301 – Qty 1

3.6.3. Assy 302 – Qty 1

3.6.4. Assy 303 – Qty 1

3.7. Identification Marking of Military Property. An Item Unique Identification Marking (IUID) shall be provided with the machine in accordance with MIL-STD-130N and all applicable documents within the standard with Machine Readable Information (MRI) for item identification marking and automatic data capture. The application of Human Readable Information (HRI) shall be used in combination with MRI and free text.

3.8. Test Data Results Used for Evaluation of Equipment to Meet Specification Requirements. Prior to destination testing the contractor shall provide a written test report which provides certifications and analytical data to support compliance the equipment has met the requirements specified herein. This report documents the results of all tests and inspections performed, provide 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(s) shall be provided to the applicable receiving activity point of contact and shall be provided within ten (10) working days of manufacturer certification. The report shall include, but is not limited to, the following:

(1) List of all tests performed and by whom witnessed (Government and contractor)

(2) Test data results used for evaluation of equipment to meet specification requirements

(3) Tabulation of all discrepancies related to specification performance requirements

(4) Description of limitations revealed by data utilized

(5) Actions taken to mitigate each discrepancy and limitation

(6) Recommendations for subsequent actions

(7) Summary conclusions

(8) Manufacturer Certification that equipment has been manufactured to OSHA CFR 1910.399 (per definition of 'acceptable')

4. QUALITY ASSURANCE PROVISIONS

4.1. Responsibility for Inspection. The contractor is responsible for the performance of all inspection requirements as specified herein. The contractor may utilize his own facility or any other commercial facility acceptable to the government. The government reserves the right to perform any of the inspections set forth in the specification to assure supplies and services conform to the prescribed requirements.

4.1.1. Measuring and Test Equipment. The contractor shall provide and maintain gauges and other measuring and testing devices necessary to assure that supplies conform to the technical requirements. In order to assure continued accuracy, these devices shall be calibrated at established intervals against certified standards, which are traceable to national standards. If production tooling such as jigs, fixtures, templates and patterns is used as a media of inspection, such devices shall also be proved for accuracy at established intervals.

4.2. Procurement Quality Assurance, Inspection and Acceptance. Only supplies, which totally conform to the specifications, shall be offered by the contractor to the government for inspection and test. The contractors test schedule shall allow consecutive inspection and test of the supplies offered. The government reserves the right to charge the contractor any additional cost of Government inspection and test when supplies are not ready at the time such inspection and test is requested by the contractor or when re-inspection or retest is necessitated by prior rejection.

4.2.1. Test at Origin. The test medium shall be fresh water.

4.2.1.1. Heating System Test. Each tank shall be filled to a level at least as high as the heating elements with water at a temperature of at least 60°F. The heating system shall demonstrate maintenance of the water temperature with ambient temperature below 50°F for a 24 hour period. If the ambient temperature is above 50°F at the time of testing, then an ammeter shall be used to show that the current drawn by the heating system demonstrates that all heating elements are functioning.

4.2.1.2. Pumping Test. The pumps shall be tested using the following combinations: pumps #1 and #3, and pumps #2 and #4 as shown on sheet 5 of SK-05. Each pair of pumps shall be tested for a combined flow of 300 GPM flow across inline resistance of 27 PSIG or 60 vertical feet of head downstream of the discharge manifold for a period of at least 6 hours. Suction shall be taken from the lower connection on a system tank, through the suction manifold. No leakage allowed.

4.2.1.2.1. Additional Pumping Test. The remaining four (4) combinations of pump pairs shall be tested for 30 minute durations of the test specified in the paragraph entitled "Pumping Test”.

4.2.1.3. Audible Noise Test. The equipment shall be tested in such a manner as to determine conformance with the paragraph entitled "Audible Noise Levels".

4.2.1.4. Alarm System Test. All alarms, including, but not limited to, high tank level, tank leakage indicator shall be tested to actuate the emergency shutdown system.

4.2.1.5. Hydrostatic Test. All piping, valves, manifolds, hose assemblies, and hull fittings shall be tested to 188 PSI for 30 minutes with no leakage allowed. Each item shall be tagged with test results including pressure, duration, and date. Hose testing shall comply with 33 CFR 156.170.

4.2.1.6. Test Schedule Coordination at Origin. The contractor shall coordinate testing schedules at origin with the receiving activity point of contact at least 15 days prior to the tests of paragraph4.2.1. The contractor shall notify the following:

Mr. Adam Johnson
Code 983
Portsmouth Naval Shipyard
Portsmouth, NH 03804
207-438-3434, adam.johnson1@navy.mil

Mr. Robert Dollar
Plant Equipment Support Office
Portsmouth, VA 23709
757-396-5790, robert.dollar@navy.mil

4.2.2. Test at Destination. All tests at origin, with the exception of the hydrostatic testing shall be repeated at destination. The test medium shall be fresh water.

4.3. Test and Evaluation Report. A test and evaluation report shall be prepared by the contractor and submitted to the Government for all tests described in 4.2.1 and 4.2.2. The report is required within ten (10) working days of test completion.

5. DELIVERY

5.1. Restricted Colors. The 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 wrapping materials, bags, tape, or other covering materials for preservation, packaging, and packing.

5.2. Special Delivery Instructions. The contractor shall notify the receiving activity of the scheduled arrival date of the equipment and any special handling requirements. Notification shall be made not less than 72 hours prior to the delivery date. Shipment of materials shall be coordinated with site preparation and installation. 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 shall be refused.

6. INSTRUCTIONS TO OFFERORS

6.1. Requirements for Technical Proposals. Offerors shall submit, in duplicate, technical proposals written in the English language, with a font size of at least 10 points. The proposal shall enable government personnel to make a thorough evaluation and determination as to whether or not the proposed equipment fully meets the requirements of the solicitation. To this end, each proposal shall be so specific, detailed and complete as to demonstrate that the offeror has a thorough knowledge and understanding of the requirements. Statements that paraphrase the specifications or attest that "standard procedures will be employed", "will comply", "take note of", etc., are insufficient. Each proposal must be sufficiently adequate to demonstrate full compliance with each paragraph in the technical requirements of the specifications. Failure to comply with these instructions may result in rejection of an offer.

6.2. Requirements for Technical Evaluation Data. In order to substantiate that the services offered are adequate to meet the requirements specified herein offerors shall submit descriptive material including illustrations, catalog cuts, schematic or engineering drawings, conceptual explanation or other descriptive literature that relates specifically to the equipment being offered. Failure to comply with these instructions may result in rejection of an offer. As a minimum, the proposal submission shall include the following:

a. Data that demonstrates compliance with the performance, safety and construction standards of the specifications.

b. Structural, mechanical, and electrical design, and performance specifications for all major assemblies and subassemblies of the equipment.

c. Scope and schedule of work.

d. Description of operation and maintenance.