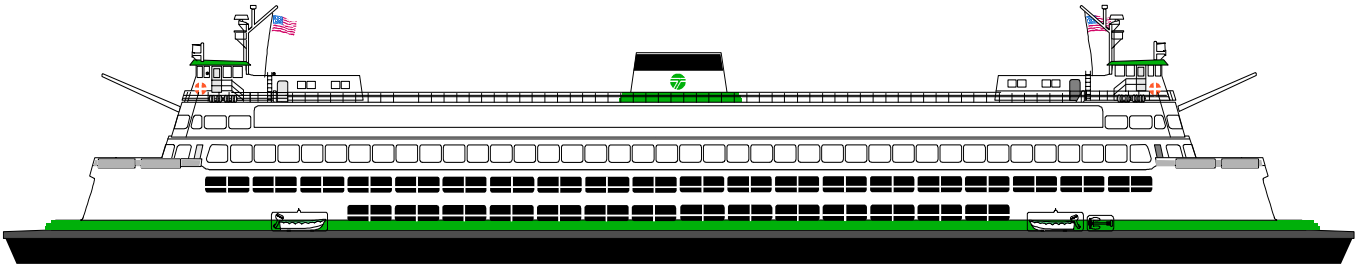

# WASHINGTON STATE FERRIES

## WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

# M. V. YAKIMA DOCKSIDE

## CONTRACT NO. 00-6900

**US FTA #WA-03-0175-01**

**HSTS04-04-G-GPS653**

# TECHNICAL SPECIFICATIONS

**JANUARY 2005**

# TECHNICAL SPECIFICATIONS

# WASHINGTON STATE FERRIES

# M.V. YAKIMA DOCKSIDE

# CONTRACT NO. 00-6900

# TECHNICAL SPECIFICATIONS

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# WASHINGTON STATE FERRIES

# M.V. YAKIMA DOCKSIDE

# CONTRACT NO. 00-6900

# TECHNICAL SPECIFICATIONS

**For the following Technical Specifications, the Contractor is to provide all labor, material and equipment to accomplish each and every Bid Item unless otherwise specified.**

**The Specification Item sub-titles in brackets are for WSF internal use only, for Life Cycle Cost modeling. Bidders should ignore such bracketed sub-titles.**

## 1. BERTH VESSEL
**{NON-LIFE CYCLE}**

M.V. YAKIMA Vessel Particulars:

**Length**: 382' 2", **Beam**: 73' 2", **Draft**: 18' 6", **Gross Tons**: 2704

A. Provide labor, material, and equipment to berth the Vessel for accomplishment of the Work specified herein, and any necessary repair.

B. When the terms forward, aft, port or starboard are used, No. 1 End is to be considered the bow.

## 2. TEMPORARY SERVICE
**{MAJOR MECHANICAL}**

A. Install one (1) telephone on board in a location designated by the Vessel Staff Chief Engineer. The telephone is to have one (1) outside line with toll-free access to Seattle and vicinity and, if different, one (1) line for local numbers. The telephone shall have touch-tone service if available from the Contractor's telephone system.

B. Provide and maintain electricity, water, sewage removal, safe lighted gangway and trash removal services while Vessel is in the Contractor's facility. Estimate 15,000 gallons of accumulated sewage generated while at the Contractor’s facility.

C. Provide temporary lighting and ventilation throughout the Vessel during the time that Vessel electrical systems will be inoperable in the course of this Work. Temporary lighting levels shall be at least equal to those lighting levels provided by the installed lighting. Temporary connections directly into the lighting transformers are authorized. Provide temporary connections to main motor and propulsion generator heaters, No. 1 and 2 ends davit control heaters, one (1) potable water pump and one (1) ships service boiler to maintain heat on the Vessel. Show all temporary connections to the Vessel Staff Chief and the WSF Inspector prior to energizing.

D. Provide temporary power to the Pilothouse 24VDC, TEP and Engine Room 24 VDC systems battery chargers.

E. Provide Safety and Security for the entire Vessel throughout the construction, repair or preservation period until such time as the WSF Inspector has accepted re-delivery of the Vessel. Every reasonable precaution shall be taken to protect the Vessel from the hazards of fire, flooding, pilferage, malicious damage, and other events including cataclysmic phenomena of nature.

F. Clean and gas free all spaces and tanks associated with the Work, as necessary, and obtain a Marine Chemist certificate for “SAFE FOR WORKERS”, and “SAFE FOR HOT WORK”. Maintain the certificates during the course of the Work for all Work Items of this Contract

G. Provide and maintain comprehensive and effective fire prevention and fire detection, and fire fighting programs and systems sufficient to ensure the safety and integrity of the Vessel. Provide personnel trained in shipboard fire fighting techniques and also trained to cooperate with, and assist, local fire fighting organizations. Provide sufficient shore fire lines to ensure an adequate supply of fire fighting water, at sufficient pressure, and maintain an adequate number of tested fire-hoses aboard the Vessel to effectively fight fires from two (2) directions at any location in the Vessel.

H. Provide space on the pier adjacent to the Vessel for a WSF supplied 20’ container the Vessel Staff Chief will use for storage.

I. Provide and maintain portable fire extinguishers in sufficient quantity, and of the appropriate type, to combat local fires of any Class. Provide sufficient fire watches, including roving watches as may be required, to ensure that fires that may be inadvertently started by welding sparks or heat, electrical malfunction, or spontaneous combustion are detected, reported and promptly extinguished.

J. The Contractor shall provide and maintain rigid control of welding and grounding for the protection of the hull, hull systems, and appendages during the entire time the Vessel is in the custody of the Contractor. The Vessel shall be properly grounded throughout the period of the Contract except when the Vessel is underway for Trials. There shall be no welding or air arcing undertaken aboard the Vessel until a hull corrosion protection system has been installed to the satisfaction of the WSF Representative and hull ground cables are installed. Provide and maintain zinc anodes for hull corrosion protection.

1. Hull potential readings shall be taken twice daily until satisfactory potentials have been obtained and at least weekly thereafter. The Contractor shall maintain a written log that indicates the station at which each reading was taken, the amplitude and polarity of the reading, the time and date, and the name of the individual making the readings. This record shall be made available to the WSF Representative upon request.

   a) Provide an exact copy of the hull potential log, to date, to the WSF Representative in conjunction with progress billings. Progress payments WILL NOT be made until the required hull potential logs have been received by the WSF Representative.

2. The total cross-sectional area of hull ground wire shall be one million circular mils minimum per 1,000 amperes per 100 feet.

**NOTE:**

Hull potential shall be maintained in the range of +.75 to .9 V as measured on a certified U.S. Filter Electro Catalytic corrosion potential meter, silver-silver chloridem Model 33419-3. This shall be the only meter used to measure hull potential.

## PAINTING OF VESSEL AND HULL PRESERVATION

## (ATTACHMENT NO. 1)

## MARINE COATING SPECIFICATION AND COLOR SCHEME

**Area Preparation, Surface Preparation, Grit Blasting, Paint Coatings, and Inspection for Vessel's hull, curtain plates, casing and super structure shall be in accordance with Washington State Ferries' Marine Coating Specification, 01/03 unless otherwise specified in the following Specifications.**

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## REMOVAL CATEGORIES AND REQUIREMENTS

## (ATTACHMENT NO. 2)

## SUPPLEMENTAL SPECIFICATION

**Disposition of all removed material shall be in accordance with Attachment No. 2, WSF Supplemental Specification, WSF 002 unless otherwise specified in the following Specifications.**

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## GENERAL CONSTRUCTION REQUIREMENTS

## (ATTACHMENT NO. 2A)

## SUPPLEMENTAL SPECIFICATION

**Details of all piping, structural and electrical installations shall be in accordance with Attachment No. 2A, WSF 003 General Construction Requirements, unless otherwise specified in the following Specifications.**

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## WSF FURNISHED MATERIALS

## (ATTACHMENT NO. 2B)

## SUPPLEMENTAL SPECIFICATION

**List of WSF furnished material with location and date available.**

## 3. REPLACE SHIP SERVICE DIESEL GENERATORS
**{MAJOR MECHANICAL /ELECTRICAL SYSTEMS}**

A. Disconnect all services and remove the existing #1 and #2 Ship Service Diesel Generator sets, and the existing Vital Generator set, and replace them with new, WSF furnished, DETROIT Model S60 engine coupled to a NEWAGE Model HCM434E generator sets. The owner furnished material is listed in **Attachment No. 2B**, and shown on **Attachment No. 3J.** The Contractor will pick up the generators at the WSF warehouse located on 6th Ave. The new #1, #2, and #3 Ship Service Diesel Generator sets are all of the same size, and will have the ability to run any two (2) of the three (3) generator sets in parallel with a third in stand-by mode ready to start, as shown in **Attachment No. 3,** WSF Dwg. No. 8203-646-002-01, M.V. YAKIMA, Generator Replacement Structural Modifications, thru **Attachment No. 3J,** PDDA Dwg. No. S60MGS330-6m475 No. 03-612761.

**NOTE:**

All welding qualifications, procedures, and certifications shall meet the requirements for welding as set forth in **Attachment 2A** of this Specification.

B. Develop and submit to the WSF Inspector for approval a detailed written plan outlining the procedure for the removal of the existing Generators and the one-piece installation of the new generator sets. Indicate any temporary shoring, location of all lifting devices (their attachment points), the loads upon lifting devices at their anchor points, and the intended removal/replacement route (including location of cuts in Vessel structure).

**NOTE:**

Unit weight of each new unit is approximately 6500 lbs. Existing generators unit weight is approximately 6700 lbs.

C. Note and map the location of all interferences prior to removal of the generators. Remove all necessary interferences and reinstall on completion of work. Protect all areas in the vicinity of hot work. Moved and/or reinstalled interferences will be re-insulated and preserved in same manner as original installation. Modify, reroute, and relocate, in a location designated by the Vessel Staff Chief Engineer, any lights, pipes, alarms, vents, remote operators, hose reels or other equipment that will interfere with the clear opening.

D. Relocate the workbench in a location designated by the Vessel Staff Chief Engineer. Fabricate a new 3” by 3” by ¼” angle frame for the workbench.

E. Drain and properly dispose of lube oil, fuel, and water from the generator sets. Disconnect and hard blank, including gaskets if needed, all connection points to prevent contamination from entering the engines and fluids leaking from them. Remove the lube oil, fuel and water piping as shown on **Attachment No. 3B**, WSF Dwg. No. 8203-646-074-01, M.V. Yakima, Generator Replacement Mchry Arr & Piping Mods and on the removed vital generator back to the nearest "T" and hard blank.

F. Sketch the planned shipping accesses and submit the sketches to the WSF Inspector and the USCG Inspector for approval prior to cutting or refer to the access provided for the Ship Service Generators.

G. Clean the entire bilge areas of both Engine Rooms, and maintain cleanliness during the course of the Work.

H. Disconnect all piping, tubing, electrical connections, and off skid instrumentation connections from the existing #1 and #2 Ship Service Generator sets, and Vital Generator set. Plug all openings in the three (3) removed generator sets using threaded plugs, or bolted blind flanges with gaskets. Disconnect the three (3) generator skids from the ship structure.

I. Remove the existing #1 and #2 Ship Service Generator sets, and Vital Generator set, and transport to WSF warehouse at Todd Pacific Shipyard, Harbor Island, Seattle, WA. Notify the WSF Representative fourth-eight (48) hours prior to the delivery time. Off load handling will be provided at the delivery location

J. Modify existing #1 and #2 Ship Service Generator set foundations, fabricate and install a new # 3 Ship Service Generator set foundation, and remove the existing Vital Generator set foundation back to hull structure in accordance with **Attachment No. 3A,** WSF Dwg. No. 8203-646-062-01, M.V. Yakima, Generator Replacement Exhaust Modifications. The area under catwalk where the vital generator was removed shall have deck plates and framing installed to fill the opening to the bulkhead.

K. Remove existing generator set piping in accordance with **Attachment No. 3B,** and the requirements of **Attachment No. 2A**. Remove deck gratings and associated grating foundations in the vicinity of removed generators in accordance with **Attachment No. 3**. Piping removals include pipe, tubing, instruments, valves, gauges and gauge boards, foundations, hangers, etc. which will not be reused during the course of this Work. Remove the existing vital generating piping back to the first "T" and cap.

L. Remove/modify existing generator exhaust piping in accordance with **Attachment No. 3A**.

**NOTE:**

The existing Vital Generator set will be removed from #1 Engine Room, and a new generator set, designated #3 Ship Service Diesel Generator, will be installed in #2 Engine Room under this Contract. The existing Vital generator set exhaust system shall be removed, in it's entirety, back to base structure. Penetration through the stack top shall be inserted to match surrounding structure.

M. Remove Main Power, Heater, Voltage Regulator, Excitation, and Governor Speed Control cables from the SSG1, SSG2, and Vital Generator to the Ship Service Switchboard. Removals are identified on **Attachment No. 3E**, WSF Dwg. No. 8203-646-090-02, M.V. YAKIMA ~ Electrical One-Line Diagram Ripout. Existing bulkhead and deck penetrations may be reused using new insert blocks, stayplates, and end packing for MCTs and MCPs.

N. Remove alarm sensor cables C-SA57 and C-SA58, the J-box and cable, and connecting individual cables from engine oil pressure switches and high jacket water temp switches on both Ship Service Generator sets and Vital Generator set, back to the switchboard. Remove the START CUTOUT PRESSURE switch installed at each engine.

O. Replace existing wire ways carrying the removed cables listed above with new wireways using slotted cable cross members which will accept stainless steel banding.

P. Transport the new Ship Service Diesel Generators from WSF's warehouse on 6th Ave. On load handling will be provided by the Contractor at the pick-up location. Notify the WSF Inspector 48 hours prior to the pick up time. Off-load at the Contractor's facility, inspect, and install, the new diesel generator sets. Inventory all parts shipped with the set. Provide an inspection and inventory report to the WSF Inspector upon receipt of the set. Store the set in a dry, covered environment at all times.

Q. Install the Generator sets assembled on the skids as one-piece unit on to their new and modified foundations, and bolt the vibration isolators to the foundation as shown on **Attachment No. 3**. Do not tilt more than 30 degrees during loading.

R. Modify, fabricate, and install service piping and off engine mounted filters and coolers for the three (3) new generator sets in accordance with **Attachment No. 3B** and the requirements of **Attachment No. 2A**. New piping shall be hydrostatically tested to one and one half times (150%) maximum allowable working pressure (MAWP) for each system. Fresh water systems shall be flushed with fresh water until no sediment is observed in a white muslin bag with magnet inside bag.

S. Install new Contractor Furnished saltwater pumps, controllers and piping as shown on **Attachment No. 3B**. Wire the pump in accordance with **Attachment No. 3C,** WSF Dwg. No. 8203-646-090-04, M.V. Yakima, S.W. Cooling Pumps Wiring Diagram. Special attention should be taken for locating automatic voltage regulator and Local Engine Operating Panel (LOEP) The display on the LEOP should be located so that the display is at eye level ambient lighting will wash out the display. Room should be made at the bottom of LOEP for cable installation.

T. Thoroughly clean and flush the lube oil and fuel oil piping systems of the three (3) new diesel engines. Fuel and lube oil systems shall be flushed from the nearest storage or day tank to the engine connection. Bypass the pumps and piping components that might be damaged or plugged by debris during the flushing. The lube oil and fuel system piping shall be flushed by continuously circulating hot system lube oil (temperature maintained between 130°F - 140°F), the fuel oil system using fuel oil at ambient temperature, at a velocity of at least six feet (6') per second through a temporary ten micron (10µ) filter and strainer system fitted with white muslin bags with magnets inside bag until filters, muslin bags and magnets remain clean for two (2) consecutive two (2) hour runs at full flow operation. Flushing shall be accomplished utilizing pumping devices that do not form a part of any piping system permanently installed in the Vessel. Pipes shall be vibrated and rattled during the flushing activities to break loose and move debris.

U. Modify existing #1 and #2 Ship Service Diesel Generator sets exhaust piping and install new hangers in accordance with the requirements of **Attachment No. 2A** and **Attachment No. 3A**. Fabricate a complete new #3 Ship Service Diesel Generator set exhaust piping system in accordance with **Attachment No. 3A**. The new Contractor Furnished exhaust silencer shall be a Beaird Industries, spark arresting, Maxim Model MSA2, size 8", or equal. Modified and new exhaust piping shall not have any angular misalignment with WSF Furnished expansion joint.

V. Insulate the new and modified exhaust piping in accordance with **Attachment No. 3A**. Materials containing asbestos shall not be used. Removable blankets shall consist of the following:

Jacketing 304 SS wire mesh.

Barrier Silicon impregnated 16-oz fiberglass cloth.

Insulation 3" needled type E type fiberglass or ceramic fiber mat.

Liner 304 SS wire mesh or SS foil.

Securing 304 SS lacing hooks and wire.

Seam fasteners Hog ring staples and Teflon coated SS thread.

W. Install new, cables from the new #1, #2, and #3 Ship Service Diesel Generator sets to the new Ship Service Switchboard, Emergency Switchboard and Power Panel P1 in accordance with **Attachment No. 3D,** WSF Dwg. No. 8203-646-090-01, M.V. YAKIMA, Electrical One-Line Diagram and **Attachment No. 3G,** WSF Dwg. No. 8203-646-095-03, M.V. YAKIMA, Generator Control Wiring Diagram, utilizing new wireways as described above. Wherever new penetrations are required they shall maintain the watertight and fire ratings of the bulkhead or deck being penetrated. Existing bulkhead and deck penetrations may be reused using new insert blocks, stayplates, and end packing for MCTs and MCPs. Control cables are to be pulled into the switchboards and cabinets, floaters, cable tags and transits packed. Termination of control cables will be by a WSF supplied Contractor.

X. All the necessary accessories, alarms, excitation systems and automatic features shall function as a unit and the installation shall be complete in every respect. Except as otherwise required, existing wiring may be reused if it matches the requirements of the new system and if the existing wiring is undamaged. All reused cabling shall be tested in accordance with **Attachment 2A,** General Construction Requirements, Cables to be Reused, to the satisfaction of the USCG Inspectors. Disconnect and remove the existing main power cables to the generators as **Category "D"**. Disconnect and pull back the existing vital generator heater power cables and the existing vital generator alarm cables as **Category "D"**. Disconnect and pull back and remove the existing No. 1 and No. 2 generator heater power cables and the existing alarm cables as **Category "D"**. Power to the Pre-Lube Pumps and the Generator Condensate/Standstill Heaters should be provided from Panel P-1 to the local disconnect switches. From there, a D-9 cable shall be provided to the Pre-Lube Pump Controller and a single, D-9 feeder shall be provided to the heater relay (GHR) in the OFE Ships Service Switchboard. The intent is for a single disconnect to interrupt all external 120 Vac power to the machines. From the switchboard, two (2) D-9 feeders shall be provided, one (1) to the block heater and one (1) to the condensate heater of each alternator/prime mover.

Y. New cable shall be supplied and installed by the Contractor. When specifying interconnecting power and control cable types for installation, the Contractor shall use MIL-C-24643, Low Smoke cable. When the required cable is not available in MIL Standard, then the Contractor shall call out IEEE Standard. 45-1998 cable, or other appropriate cable acceptable to the USCG and ABS. The WSF Representative will consider no other commercial cables. Armored cable shall <u>only</u> be used where it is specifically called for, otherwise, all cable shall be unarmored. When connecting multiple alarms (signals) from a piece of equipment such as a RDU, the Contractor shall use junction boxes and multi-conductor cable or shielded pairs/triad cable. Existing wireways may be reused to the maximum extent practicable unless specifically directed different in this Specification. Cable may be double banked when de-rated as described above provided that a minimum air gap of one (1) cable diameter of the largest cable in a tier is maintained between adjacent tiers. Lan cables shall be installed in accordance **Attachment No. 3H,** Appendix D, Siemens Instruction Manual PROFIBUS Networks. Install new wire ways and MCT's for the Lan cables between the engine rooms and the Engineers Operating Station.

Z. Install the twenty-four (24VDC) power supply system and panels as shown on **Attachment No. 3G**. Fabricate and install an additional battery rack in the battery room. The new battery chargers shall be located on the station in the engine crews dayroom. Connect the generators to the twenty-four (24VDC) power supply for the control and monitoring. Install the Local Operating Panels, AVR and prelube pump controllers.

AA. All exterior wire way clips and studs shall be 316L stainless steel. All new cable banding, and existing cable banding where disturbed, shall be stainless steel. Install flexible channel rubber between banding material and the cable.

BB. Install alternator temperature monitoring system in accordance with **Attachment No. 3I,** WSF Dwg. No. 8203-646-099-01, Super Class Ferries Alarm & Monitoring System. Connect the new generators to the FR circuit using **Attachment No. 3F,** WSF Dwg. No. 8203-646-095-01, M.V. YAKIMA, Circuit "FR" Modifications as a guide. The RTD cables not identified on **Attachment No. 3I** shall be LS2SWU-, with the number of conductors determined by the run. The thermocouple cables not identifies on **Attachment No. 3I** shall be LSCKX-, with the number of pairs determined by the run.

CC. Furnish and install new deck plating and deck plating foundations around the three (3) newly installed diesel generator sets using **Attachment No. 3** as a guide. The deck plates shall be fit so that there is no more than an 8” gap around the generators. Fill in a piece of deck plating between the water tank and each generator. Modify the existing handrail, walkway, and walkway foundations, to match existing, in the area where the existing Vital Generator set was removed to eliminate the “notch” in the 14 '- 0" walkway where the generator was previously installed.

DD. Test the new diesel generator set installations and switchboard modifications to the satisfaction of the USCG Inspector, the Vessel Staff Chief Engineer, and the WSF Inspector. All aspects of switchboard and generator functionality shall be demonstrated by the WSF supplied Contractor including but not limited to emergency shut down, paralleling, load sharing, alarms and safeties, and integration with existing Vessel systems. Load tests shall be six (6) hours long per Diesel generator. The three (3) new diesel generator sets will each be tested using a Contractor provided resistive load box when demonstrating power output, load sharing and paralleling.

1. WSF will provide the services of a factory representative for verification of start up and testing. The Factory Representative will be present at light off and during load testing. The Contractor shall provide a minimum of two (2) weeks notice prior to initial light off to the WSF Inspector. Testing of the diesel-alternator sets shall demonstrate, at a minimum, the following:

2. Satisfactory operation of the unit with the alternator at its rated RPM and 100 percent of rated load for four (4) hours, followed by 110 percent rated load for two (2) hours. The Contractor shall provide the load bank for this test. Load testing will utilize the bus stubs at the back of the switchboard.

3. Proper operation of the start and stop controls both at the unit and at the remote stations.

4. Proper operation of speed control both at the unit and at the remote stations.

5. Normal operation of all meters, gages, and alarms.

6. Proper temperatures and pressure are maintained during the load test.

7. Proper functioning of all safety, shutdown, and auto-start devices.

EE. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices. WSF will provide an engine crew in support of generator testing and check out during load tests and dock trials.

**NOTE:**

For bidding purposes assume three (3) days resistive load bank services will be required. This Item will be adjusted upwards or downwards to account for the actual days required by the DETROIT DIESEL Technical Representatives.

***LOAD BANK REQUIREMENTS***

The Contractor shall provide a resistive load bank with all operators, cables and ancillary equipment required. The KVA capacity of the load bank shall be, at a minimum, 110% of the combined load with two (2) new Ship Service Diesel Generator sets on-line (in parallel), and be compatible with the new system installed by the Contractor. The load bank and operator shall be on site for system start-up, grooming, and balancing. The load bank may be installed on the Vessel with the leads of appropriate length provided and installed between the load bank and the Vessel's generator load.

FF. Provide assistance to DETROIT DIESEL Technical Representatives to assist with system grooming.

**NOTE:**

For bidding purposes assume eighty (80) hours will be required. This Item will be adjusted upwards or downwards to account for the actual labor hours required by the DETROIT DIESEL Technical Representatives.

GG. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Provide labor, material and equipment to coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT). Hand stripe all edges using INTERNATIONAL, Intertuf 262 a minimum of 5 mils (DFT). Apply a minimum of 2 mils, to (DFT), to cover, INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

## 4. REPLACE SWITCHBOARD
**{PROPULSION SYSTEMS}**

A. The Work Item describes the installation of a WSF furnished replacement for the existing ship service and vital switchboard located in the EOS as addressed in the specifications and drawings. The owner furnished material is listed in **Attachment No. 2B**. The purchase specification for the new switchboard is contained in **Attachment 4A**, Section 89* Super Class, Ships Service Switchboard Procurement Specifications.

B. Remove the existing switchboards and replace them with new, WSF Furnished as shown in **Attachment No. 4** WSF Dwg. No. 8203-646-090-03, M.V. YAKIMA Refurbishment, EOS Arrangement Ship Service Switchboard Installation 2003, thru **Attachment No. 4B,** Dwg. No. 04L0301D-1, Lloyds Controls, Inc., M.V. Kaleetan, Ships Service Switchboard, AMS and MCC Floor Plan Fabrication Details**.**

C. The installation of the new switchboard should be coordinated with the installation of the new motor control centers and the alarm and monitoring system in the EOS addressed in Work Items MOTOR CONTROL CENTERS and ALARM AND MONITORING SYSTEM.

D. Develop and submit to the WSF Inspector for approval a detailed written plan outlining the procedure for the removal of the existing ship service switchboard and installation of the new switchboard. Indicate any temporary shoring, location of all lifting devices (their attachment points), the loads upon lifting devices at their anchor points, and the intended removal/replacement route (including location of cuts in Vessel structure).

E. Note and map the location of all interferences prior to removal of the switchboards. Remove all necessary interferences and reinstall on completion of work. Protect all areas in the vicinity of hot work. Moved and/or reinstalled interferences will be re-insulated and preserved in same manner as original installation. Modify, reroute, and relocate, in a location designated by the Vessel Staff Chief Engineer, any lights, pipes, alarms, vents, remote operators, or other equipment that will interfere with the clear opening. Modification of the crews day room area is covered in Item 15 Engine Crew Dayroom Modifications.

F. Disconnect all ship's wiring from the existing ship service switchboard and other components to be replaced or relocated. Carefully document all connections. Protect cables from damage during the removal and installation of the new switchboard. Reconnect all cabling to be retained and test for proper operation.

G. Switchboard cables that are located within the Engine Room/EOS shall be replaced in their entirety. MIL-C-24643A cables and MIL-C-915E cables that extend beyond the Engine Room may be reused if they meet the criteria listed in **Attachment No. 2A**, General Construction Requirements. Candidate cables shall be extended by using ABS approved splice kits or junction boxes. It is permissible to splice MIL-C-915E cables to MIL-C-24643A cables.

H. Locate all removed material in a suitable central warehouse area for inspection by WSF. WSF personnel will remove components desired for retention as spares. The Contractor shall dispose of the remaining material as **Category "D".**

I. The switchboard and the MCC are to be manufactured with shipping splits. An access cut shall be made in the Auto deck in way of the Ships Service and Vital Service Switchboard that is large enough to accommodate the largest section including all protrusions of dripshields, operators, and handrails and including the necessary padding and crating to protect the switchboard during installation. Sketch the planned shipping accesses indicating the extent of the cut in the Auto deck and how it will be restored and submit 3 copies of the sketches to the WSF Inspector for approval prior to cutting. The switchboard sections shall be lowered through the cut into the EOS. Restore disturbed structure, components, and systems back to their original condition.

J. Land, scribe to deck, and weld down a new, WSF furnished, common Switchboard/MCC/AMS foundation as shown on **Attachment Nos. 4,** and **4B**. The new foundation shall be installed level to baseline.

K. Land the new, WSF Furnished, Distribution; Emergency Bus Tie; Generators No. 1, No. 2, and No. 3; Synchronizing, AMS PLC; and AVTRON Add Tracker/Performance cabinet sections of the new switchboard on the foundation as shown on **Attachment No. 4**.

**NOTE:**

All cabinets shall be installed with, WSF furnished, distributed isolation material (DIM) between the entire footprint of the foundation and the line-up of cabinets.

L. Provide and pull all interconnecting cabling to and between new equipment. The Work includes all new and modified cableways and hangers.

M. Modify the existing FR circuit as shown on **Attachment 3F**.

N. Megger test and continuity check all new and reused cable associated with Work under this Contract.

O. Interconnecting cable within each Engine Room between existing and new or relocate equipment may be reused, at the Contractor's option, if the existing length is sufficient to remake the necessary connections, and a megger of the existing cable proves it good. Contractor is responsible for connecting power cables in the switchboard.

P. Install, WSF furnished, sway bracing with vibration dampening couplings from the enclosure tops to main structure.

**ATTENTION:** WSF supplied technical representative requires fifteen (15) working days, from the time when the completely installed equipment and cables are turned over to WSF as a system to terminate control wiring. The Contractor is to develop a plan that shows the turn over of equipment starting from the most remote items to the EOS to allow the WSF supplied tech rep to accomplish the terminal hook-up of the AMS and system grooming. The Contractor shall take this fifteen (15) working day time frame into consideration when planning removals, equipment installation, cable installation, set up, and testing of the new AMS system.

Q. All electrical enclosures and/or equipment manufactured for electrically conductive material shall be electrically bonded (grounded) to the Vessel structure as follows:

1. Bonding shall be achieved through the method of mounting equipment, or by use of flexible copper cable or strap. Either method shall form a positive ground connection from the enclosure to the Vessel structure;

2. Bonding cables shall be installed using minimum length of cable and be consistent with, and meet Regulatory Agency requirements;

3. All bonded cables shall be installed in locations that provide minimum exposure to possible physical damage and provide inspection, repair and replacement access;

4. Bonding cables shall be attached to Vessel structure by a dedicated weld stud or weld pad and shall not be attached to pipe hangers, wireways, mounting hardware, or attachments;

5. Bonded equipment shall include, but is not limited to, switchboards, transformers, electronics cabinets, battery chargers, transfer switches, lighting fixtures, and receptacles. Electrical devices isolated by nonconductive bushings, boots, vibration isolators, and dampers shall also be bonded (grounded) to the hull. All new equipment capable of generating static discharges shall also be bonded to the hull.

R. Provide assistance to the WSF supplied technical representatives to assist with system grooming.

**NOTE:**

For bidding purposes assume eighty (80) hours will be required. This Item will be adjusted upwards or downwards to account for the actual labor hours required by.

S. Prepare and preserve the deck to match the existing installation.

T. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT) using INTERNATIONAL, Intertuf 262 a minimum of 5 mils (DFT) all edges. Apply a minimum of 2 mils, to (DFT), to cover, INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

U. Replace all disturbed structural, thermal, and acoustical insulation to match original installation.

V. Repair all disturbed deck filler and coverings to match existing system.

1. New deck repairs shall provide a continuous surface to suit and abut all new equipment locations.

2. The Contractor shall match the existing color and design of the floor covering to the greatest extent possible. The Contractor shall provide samples of the new deck covering to the WSF Inspector for approval prior to ordering.

W. Provide new dielectric matting for the new Propulsion Switchboard line-up and Control Console. Installations shall meet the requirements of 46 CFR Part 111.30-11.

1. Dielectric safety matting shall be USCG approved Electrical Grade PVC Matting, MIL-SPEC M-15562F, Type 3, laid loose over the finished deck.

2. Matting shall extend to the full width of all such electrical equipment and extend out a minimum of three feet (3’) from the equipment.

3. The Contractor shall provide samples of the new dielectric matting to the WSF Inspector for color approval.

X. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices. Demonstrate correct operation to the WSF and Coast Guard Inspectors. WSF will provide an engineering operating crew in support of running generators for this testing and for check out during load tests and dock trials.

Y. The installation/operational testing of the Switchboard shall include, but not be limited to, the following:

**Visual Inspections**

Verify that the switchboard installation hook-up is in accordance with the Technical Specifications and drawings.

Check bonding (grounding) of cubicles and components of cubicles.

Check availability and marking of components in accordance with the relevant drawings.

Verify the wire size and wire markers of all installed wires and cables.

Check bus bar torquing.

Measuring of clearance and creepage distance of all installed wires and cables.

**Functional Tests**

Check the withdrawal and insertion of drawout circuit breakers and contactors.

Check the operation of all grounding switches.

Check all mechanical interlocks.

Check current transformers.

Check voltage transformers.

Check ground fault protection.

Check the interchangeability of components.

Functional test of control, measuring and protection circuits.

Functional test of alarm and monitoring sensors installed in switchboard.

Verify the calibration of measuring instruments.

Verify the calibration of the protection devices.

## 5. AMS INSTALLATION
**{PROPULSION SYSTEMS}**

A. The Work Item describes the installation of a WSF furnished Alarm and Monitoring System (AMS) located in the EOS, and installation, relocation or replacement of other electrical components in the EOS, Engine room, and elsewhere on the Vessel as addressed in the specifications and drawings. The owner furnished material is listed in **Attachment No. 2B**. The purchase specification for the new AMS is contained in **Attachment No. 5B,** Section 99***** Super Class Alarm and Monitoring System Procurement Specification. The Contractor in his planning shall consider that the Washington State Ferries (WSF) furnished components will be delivered to the shipyard not later than the arrival of the Vessel.

B. Remove the existing Alarm and Monitoring System and replace them with the new, WSF Furnished as shown in **Attachment Nos. 5** WSF Dwg. No. 8203-646-099-02 M.V. Yakima, Alarm & Monitoring System Signal List, thru, **Attachment No. 5G,** WSF Dwg. No. 5317-089-04 M.V. YAKIMA, Emergency Switchboard Control Wiring Diagram.

C. The installation of the new AMS should be coordinated with the installation of the new motor control centers and switchboard in the EOS addressed in Work Items MOTOR CONTROL CENTERS and SWITCHBOARD REPLACEMENT.

D. Note and map the location of all interferences prior to removals. Remove all necessary interferences and reinstall on completion of work. Protect all areas in the vicinity of hot work. Moved and/or reinstalled interferences will be re-insulated and preserved in same manner as original installation. Modify, reroute, and relocate, in a location designated by the Vessel Staff Chief Engineer, any lights, pipes, alarms, vents, remote operators, or other equipment that will interfere with the clear opening. Mounting the local

control panels will require the relocation cable and cable hangers, tubing bundle and the Treatment Tank sight glass and piping on the stanchions in the enginerooms. See **Attachment No. 5A**, WSF Dwg. No. 8203-646-099-10, M/V YAKIMA AMS System Arrangement for the system arrangement.

E. Remove the existing Argus, RIS, Murphy panels and associated cabling and items from the existing emergency diesel engine as shown on **Attachment No. 5E,** WSF Dwg. No. 8203-646-095-08, Rev. -, M.V. YAKIMA, Emergency Diesel Engine Alarm & Monitoring, Rip-Out. Remove the existing sensors and gauge panels from the main engines and generators.

F. Fabricate mounts and install the WSF furnished, ET200 Panels in locations designated as shown on **Attachment No. 5A**. One (1) unit goes in each pilothouse. In the No. 2 Engine Room ET-200 at the stanchion between the auxiliary generators (athwartships). Install the new main engine Local Operating Panels (LOP's) on the stanchion between the main engines. The foundation shall maintain the panels as close to the stanchion as possible to allow for access to the treatment tank below. The No. 1 End will be located above the tool board/work bench on bulkhead 30 (watertight bulkhead). The motor room enclosures will go next to the controller box for the thrust bearing lube oil pumps on the void bulkheads. The steering gear ET-200 enclosures will go opposite of the power conditioners in the Steering Gear rooms. The new foundation shall be installed level to baseline.

G. Install the new console panels as shown on **Attachment No. 5C,** WSF Dwg. No. 8203-646-099-03, M.V. YAKIMA, EOS Console Modifications.

H. Provide and pull all interconnecting cabling to and between new equipment as shown in **Attachment Nos. 3I** and **Attachment No. 5A** thru **5G**. The Work includes all new and modified cableways and hangers. Install new low voltage wire ways between each pilothouse and the EOS, steering compartments and EOS, and motor rooms to the EOS, Emergency Generator room and EOS. New wire ways shall use slotted cable cross members which will accept stainless steel banding. Alarm and monitoring PROFIBUS cable shall be installed in accordance with **Attachment No. 3H,** paying special attention to correct separation of wire ways. The RTD cables not identified on **Attachment No. 3I** shall be LS2SWU-, with the number of conductors determined by the run. The thermocouple cables not identifies on **Attachment No. 3I** shall be LSCKX-, with the number of conductors determined by the run. One source of supply for the Profieus Cables is Cascade Controls Corporation, Phone No. 206-357-0304.

I. Modify the existing FR circuit as shown on **Attachment 3F**.

J. New transits shall be installed using **Attachment No. 5D,** WSF Dwg. No. 5317-090-04, Rev. -, M.V. Yakima, Multi-Cable Transit Stuffing Tube and Collar Installation as a guide.

K. Megger test and continuity check all new and reused cable associated with Work under this Contract. Interconnecting cable within each Engine Room between existing and new or relocated equipment may be reused, at the Contractor's option, if the existing length is sufficient to remake the necessary connections, and a megger of the existing cable proves it good.

L. Interconnecting cable from areas remote into the Engine Room where the new equipment is being installed may be extended through the use of an ABS splice kit or approved junction box. All such cases shall be presented to the WSF Inspector for final approval, in writing, prior to extending the cable. In these cases, the reused portion of the cable shall be meggered to prove it is good.

M. Install, WSF furnished, sway bracing with vibration dampening couplings from the enclosure tops to main structure.

N. Remove the existing four (4) Woodard PGA governors from the engines, box the governors up for protection and send to a certified Woodward Governor repair shop for conversion from 120 VDC to 24 VDC operation. Return the governors when complete and reinstall onto their respective engines. Replace all 120 VDC FO shutdown solenoids on the existing two (2) Boilers with WSF furnished 24 VDC units, see **Attachment No. 3F**.

O. Install all, WSF provided, sensors as shown on **Attachment Nos. 3G, 3I,** and **5A**. This includes the nine (9) tank sensors (Fuel Oil (5 ea.), Potable Water (2 ea.) and Sewage (2 ea.). The Contractor shall pump the tanks dry, clean and certify gas free. Conduct a hydro of existing pressure tubing. Reuse the existing tubing to the fuel tanks. Relocate the No. 1 day tank tubing, sewage tank tubing and indicators to the bulkhead with the remaining indicators, extending the tubing across the EOS. Install new tank penetrations, tank sensors, and wire runs the potable water tanks to the EOS. Repair tank coatings damaged by this Work.

P. Install new sensor pipe and tubing to connect all enclosures to equipment sensors as located on **Attachment Nos. 3I** and **5A.** Install new isolation valves on all tubing runs prior to connecting the new LOP's. All instrumentation piping/tubing systems shall be installed straight and true and in accordance with the requirements of this Technical Specification and **Attachment No. 2A**. The location of the piping and sensors shall be coordinated to clear openings, structural members, and other existing piping. Horizontal and vertical offsets with pipe fittings shall be made to install the system in the space available. Pipe hangers shall be PARKER Multi-Clamp, or Owner approved equal.

Q. Before installation of the piping and sensors in any part of the system, the piping and fittings shall be cleaned inside and made free of oil, dirt, and foreign matter. Screw joints and fittings shall conform to ANSI. SWAGELOK fittings shall be used on stainless tubing and products manufactured by either WEATHERHEAD or PARKER shall be used elsewhere. All connections shall be free of cuttings and burrs and shall have a maximum of three exposed threads. Lubricants and sealing compounds shall be applied to male threads prior to makeup.

R. All flexible hose shall be USCG approved, AEROQUIP, or Owner approved equal, suitable for the application. **See Attachment No. 2A**.

S. Test all new pipe and tubing installations. All piping tests shall be performed prior to concealment or covering. All systems shall remain under test for a sufficient length of time to prove tightness and systems integrity and for adequate observation by the WSF Representative (a minimum of 10 minutes). <u>An acceptable test shall indicate no leakage</u>.

T. Air pressure circuit piping shall be pneumatically tested with air to 150% MAWP. Joints shall be soap bubble tested. Fuel oil or any instrument piping, which shall carry hydrocarbons, shall be tested with 150% MAWP (PSIG) with dry nitrogen.

U. Piping systems modified by the installation of sensors shall be flushed until temporary filters installed in the system are free from visible contaminants. Flushing shall be carried out a minimum of four (4) hours. A procedure for flushing shall be developed by the Contractor and submitted for approval to the WSF prior to the testing.

**ATTENTION:** WSF supplied technical representative requires fifteen (15) working days, from the time when the completely installed equipment and cables are turned over to WSF as a system. The steering compartments, pilot houses, motor rooms and emergency generator room are to be turned over for cable termination by 1 Dec. to allow the WSF supplied Tech. Rep. to begin the terminal hook-up of the AMS and system grooming. WSF Technical Representative will terminate all cables inside the cabinets described in paragraph F and G. The Contractor shall be responsible for all terminations other than the cabinets, all continuity checks, cable penetrations, floaters, and cable tags. The Contractor shall take this fifteen (15) working day time frame into consideration when planning removals, equipment installation, cable installation, set up, and testing of the new AMS system.

V. All electrical enclosures and/or equipment manufactured for electrically conductive material shall be electrically bonded (grounded) to the Vessel structure as follows:

1. Bonding shall be achieved through the method of mounting equipment, or by use of flexible copper cable or strap. Either method shall form a positive ground connection from the enclosure to the Vessel structure;

2. Bonding cables shall be installed using minimum length of cable and be consistent with, and meet Regulatory Agency requirements;

3. All bonded cables shall be installed in locations that provide minimum exposure to possible physical damage and provide inspection, repair and replacement access;

4. Bonding cables shall be attached to Vessel structure by a dedicated weld stud or weld pad and shall not be attached to pipe hangers, wire ways, mounting hardware, or attachments;

5. Bonded equipment shall include, but is not limited to, switchboards, transformers, electronics cabinets, battery chargers, transfer switches, lighting fixtures, and receptacles. Electrical devices isolated by nonconductive bushings, boots, vibration isolators, and dampers shall also be bonded (grounded) to the hull. All new equipment capable of generating static discharges shall also be bonded to the hull.

W. Provide assistance to WSF supplied Technical Representatives including Mathews Marine to assist with system grooming and wiring checks.

**NOTE:**

For bidding purposes assume 160 hours will be required. This Item will be adjusted upwards or downwards to account for the actual labor hours required.

X. Prepare and preserve the deck to match the existing installation. Cables and MCT surfaces under the switchboard shall be painted with NELSON FSC™ Fire Protective Coating. The coating shall be applied in accordance with Manufacturer's recommendations and USCG requirements.

Y. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT). Use INTERNATIONAL, Intertuf 262 a minimum of 5 mils (DFT) on all edges. Apply a minimum of 2 mils (DFT), of INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

Z. Replace all disturbed structural, thermal, and acoustical insulation to match original installation.

AA. Repair all disturbed deck filler and coverings to match existing system. New deck repairs shall provide a continuous surface to suit and abut all new equipment locations. The Contractor shall match the existing color and design of the floor covering to the greatest extent possible. The existing tile is Armstrong Imperial Texture Standard Excelon Vinyl composition tile, 12" x 12" x 1/8". The Contractor shall provide samples of the new deck covering to the WSF Inspector for approval prior to ordering.

BB. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices. WSF will provide an engineering operating crew in support of running generators for this testing and for check out during load tests and dock trials.

CC. The installation/operational testing of the Switchboard shall include, but not be limited to, the following:

**Visual Inspections:**

Verify that the AMS installation hook-up outside the cabinets is in accordance with the Technical Specifications and drawings.

Check bonding (grounding) of cubicles and components of cubicles.

Check availability and marking of components in accordance with the relevant drawings.

Verify the wire size and wire markers of all installed wires and cables.

**Functional Tests:**

Check the operation of all sensors.

Check all alarms.

Functional test of control, measuring and protection circuits.

Verify the calibration of measuring instruments.

DD. Prior to placing tanks in service, the entire potable water system, including the storage tanks, shall be cleaned, disinfected and flushed in strict accordance with the requirements of USCG and the WHO Guide to Ship Sanitation, Annex 1. The potable water system shall be flushed sufficiently after disinfecting that water drawn from the most remote tap or faucet is free from all color, taste of paint, preservative, or disinfectant. A signed "Certificate of Disinfection" shall be provided to the State Inspector prior to the system being placed in service and prior to the Vessel Redelivery Date.

## 6. MOTOR CONTROL CENTER (MCC) INSTALLATION

**{MAJOR MECHANICAL/ELECTRICAL SYSTEMS}**

A. The Work Item describes the installation of a WSF furnished replacement for the MOTOR CONTROL CENTER (MCC) located in the EOS, and relocation or replacement of other electrical components in the EOS, Engine Room, and elsewhere on the Vessel as addressed in the specifications and drawings. The owner furnished material is listed in **Attachment No. 2B**. The purchase specification for the new MCC is contained in **Attachment 6A,** Section 91* Super Class Motor Control Center Procurement Specification. The Contractor in his planning shall consider that the Washington State Ferries (WSF) furnished components will be available for pick at the WSF 6th Ave. warehouse at the time of Vessel arrival.

B. Provide labor, material, and equipment to remove the existing MCC's and replace them with new, WSF Furnished as shown in **Attachment No. 3D** and **6A**.

C. The installation of the new motor control centers should be coordinated with the installation of the new switchboard and the AMS in the EOS addressed in Work Item No. 4 and No. 5.

D. Develop and submit to the WSF Inspector for approval a detailed written plan outlining the procedure for the removal of the existing motor control centers and installation of the new motor control centers. Indicate any temporary shoring, location of all lifting devices (their attachment points), the loads upon lifting devices at their anchor points, and the intended removal/replacement route (including location of cuts in Vessel structure).

E. Note and map the location of all interferences prior to removal of the MCC. Remove all necessary interferences and reinstall on completion of work. Protect all areas in the vicinity of hot work. Moved and/or reinstalled interferences will be re-insulated and preserved in same manner as original installation. Modify, reroute, and relocate, in a location designated by the Vessel Staff Chief Engineer, any lights, pipes, alarms, vents, remote operators, or other equipment that will interfere with the clear opening. Note the crews dayroom will be modified in Item No. 15.

F. Disconnect all ship's wiring from the existing MCC and other components to be replaced or relocated including the power panels shown on **Attachment No. 3D.** Carefully document all connections. Protect cables from damage during the removal and installation of the new MCC. Reconnect all cabling to be retained and test for proper operation.

**NOTE:**

All welding qualifications, procedures, and certifications shall meet those requirements for welding as set forth in **Attachment 2A** of this Specification.

G. Land the new MCC section of the new switchboard on the foundation along with those other switchboard sections covered in Work Item 4. See **Attachment No. 5B**.

**NOTE:**

All cabinets shall be installed with, WSF furnished, distributed isolation material (DIM) between the entire footprint of the foundation and the line-up of cabinets. See Work Item 4.

H. Install, WSF furnished, sway bracing with vibration dampening couplings from the cabinet tops to main structure. See Work Item 4.

I. Install the transfer switches for the propulsion motor fan supply as shown on **Attachment No. 3D**. The switch shall be SQ-D Class 3140DTU362AWK, double throw non-fusible safety switch (3-16) 600-60A. Provide and pull all interconnecting cabling to and between new equipment as shown in **Attachment No. 5A**. The Work includes all new and modified cableways and hangers. New wire ways shall use slotted cable cross members which will accept stainless steel banding.

J. Megger test and continuity check all new and reused cable associated with Work under this Contract.

K. Interconnecting cable within each Engine Room between existing and new or relocated equipment may be reused, at the Contractor's option, if the existing length is sufficient to remake the necessary connections, and a megger of the existing cable proves it good.

L. Interconnecting cable from areas remote into the Engine Room where the new equipment is being installed may be extended through the use of an ABS splice kit or approved junction box. All such cases shall be presented to the WSF Representative for final approval, in writing, prior to extending the cable. In these cases, the reused portion of the cable shall be meggered to prove it is good.

**NOTE:**

All cabling requirements, procedures, and installation shall meet the requirements for cabling as set forth in Work Item 3 and **Attachment No. 2A** of this Specification.

M. Prepare and preserve the deck to match the existing installation. Cables and MCT surfaces under the switchboard shall be painted with NELSON FSC™ Fire Protective Coating. The coating shall be applied in accordance with manufacturer's recommendations and USCG requirements.

N. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT). Use INTERNATIONAL, Intertuf 262 to a minimum of 5 mils (DFT) on all edges. Apply a minimum of 2 mils, to (DFT), to cover, INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

O. Replace all disturbed structural, thermal, and acoustical insulation to match original installation. Disturbed decking will be replaced in Item No. 4.

P. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices. WSF will provide an engineering operating crew in support of running generators for this testing and for check out during load tests and dock trials.

Q. The installation/operational testing of the MCC shall include, but not be limited to, the following:

Verify that the MCC installation hook-up is in accordance with the Technical Specifications and drawings.

Check bonding (grounding) of cubicles and components of cubicles.

Check availability and marking of components in accordance with the relevant drawings.

Verify the wire size and wire markers of all installed wires and cables.

Measuring of clearance and creepage distance of all installed wires and cables.

## 7. PASSENGER ELEVATOR INSTALLATION
**{NON-LIFE CYCLE}**

A. Install one (1) new, WSF furnished, MacGREGOR KONE Passenger Elevator module on No. 1 End as shown on **Attachments No. 7**, WSF Dwg. No. 8203-646-003-01, M.V. YAKIMA, Structural & Stairway Modifications in Way of Elevator Installation Removals, thru **Attachment No. 7T**, MacGregor Dwg. No. TR41002 WSF Installation of Plug in Trunk Proposal PL1 FRS 44-49 Super Class. The Owner Furnished Material is listed in **Attachment No. 2B**. Installation shall be in strict accordance with all applicable regulatory requirements. Washington State Ferries will provide the services of MacGregor Technical Representative for twenty (20) calendar days. This will include up to three (3) visits. The first will be for the lifting and positioning of the elevator. Contact Kari Laukia at MacGregor Finland, phone 358.24121.460 to schedule the technical visits. During these technical visits provide direct support to the MacGregor Representative.

**NOTE:**

For bidding purposes assume 200 manhours will be required. This Item will be adjusted upwards or downwards to account for the actual labor hours required by the MacGREGOR-KONE Technical Representatives.

**NOTE**:

Washington State Ferries will provide the required Elevator installation Certificate(s)/Permit(s) from the Washington State Department of Labor and Industries. Inspections required by the permit will be arranged by the Contractor directly with Labor and Industries.

B. Transport the elevator from WSF warehouse at TODD shipyard on Harbor Island. WSF will provide on load handling at the pick up location. Notify the WSF Inspector forty-eight (48) hours prior to the pick up time. Off-load at the Contractor's facility, inspect, and install, the new elevator. Inventory all parts shipped with the elevator. Provide an inspection and inventory report to the WSF Inspector upon receipt. Store the elevator in a dry environment at all times with the heater connected.

C. The bulkheads, overheads, and framing in the Void are presently coated with a "KEL-KOTE" Coal Tar compound**.** Provide labor, material and equipment to prepare to SSPC-SP 3, Power Tool Cleaning and recoating as directed below, only those areas disturbed by the Work. Furnish and apply a hand-striped coat of INTERNATIONAL, Intertuf 262, Black, to a minimum of 5 mils (DFT) to the back sides, corners and sharp edges of all angles, rat holes, weld seams, scallops, and beams within the prepared area. Furnish and apply one (1) full coat of INTERNATIONAL, Intertuf 262, gray, to a minimum of 6 mils (DFT) to areas prepared above. New deck nonskid for the MES station and ADA parking are addressed in Item No. 13.

D. Clear and relocate/reinstall all interferences associated with the elevator installation. Relocate power panel LP-2 from the cleaning gear locker to the new stairway. Relocate the remote electric and hydraulic watertight door actuators as shown on **Attachment No. 7A**. Reroute the 6" copper nickel sewage line and the 2" flushing and drain lines in the void around the new installation. Remove all sheathing, joiner work, deck coverings, and ceilings in way of installation. Modify and renew as required to suit the new installation and reinstall. For joiner work modifications see **Attachment No. 7**. Reroute the auto deck sprinkler piping around the new elevator trunk.

E. Move the Motor breaker panel inboard to allow the installation of the elevator trunk.

F. All connections between aluminum and steel shall be made with Detacouple (explosive bond strip), Huck™ bolts, or equal.

G. Dispose of the residual oil and remove the existing lube oil tanks in way of the elevator installation. Fabricate and install new lube oil tank as shown on **Attachment No. 7R**, WSF Dwg. No. 8203-646-078-01, M/V YAKIMA New Lube Oil Tank Structural Arrangement and Details. Install the new lube oil piping as shown on **Attachment No. 7Q**, WSF Dwg. No. 8203-646-074-02, M/V YAKIMA New Lube Oil Tank Piping Installation Arrangement.

H. Install the WSF provided elevator trunk as indicated on **Attachment No. 7A**, WSF Dwg. No. 8203-646-003-02, M.V. YAKIMA, Structural & Stairway Modifications in Way of Elevator Installation Arrangement & Details thru **Attachment No. 7J**, MacGregor, Dwg. No. LI21002, WSF Super Class, Lifting of Elevator. When landing the elevator, the Vessel shall be on an even keel. List or trim control blocks may be used. Provide a weld procedure to the WSF Inspector prior to beginning installation. Install a foundation and all stabilizing supports, shown on **Attachment No. 7A**, for the new WSF furnished Passenger Elevator. All structure shall be designed and built in accordance with ABS rules.

I. Install a mechanical ventilation system for the elevator trunk as shown on **Attachment No. 7N**. The fan shall be mounted in the overhead of the lower car deck. The fan will take suction on the elevator trunk and exhaust to the car deck. Install a closure device on the elevator natural supply. See **Attachment No. 3D** for electrical installation requirements.

J. Modify the motor room ventilation exhaust louvers as shown on **Attachments No. 7, 7A and 7N**.

K. Modify the return plenum for the main passenger cabin in way of the new installation**.** Using similar materials blank the exhaust ducting from frame 45 to frame 40 and remove the inlet grills. Enlarge the remaining three return grills to 21” by 16”. Replace the ducting from the grills to exhaust plenum 18” by 8” ducting.

L. Install a two (2”) inch gravity drain pipe with a ball valved termination from the elevator pit bilge in the bottom of the elevator to below the deck plates in the motor room. Provide a removable screen over the elevator pit drain.

M. Install a Texas Deck drain, as shown on **Attachment No. 7**. The new drain piping shall be tested by filling to overflow with clean water. Acceptable tightness shall exhibit no leaks over a ten (10) minute period.

N. Provide new non-ACM bulkhead paneling and joiner work similar to surrounding the elevator trunk in the passenger cabin. The color is to match the surrounding bulkheads in the passenger cabin on the exposed side, as shown on **Attachment No. 7**. Continuously weld the doorframes and filler pieces around each levels door openings. Frames are shipped tack welded to the elevator trunk and will require final positioning before seal welding. Install new power assist door opener as shown on **Attachment 7A**.

O. The installation shall include all wiring and wire runs for electrical power, lighting, and communications as shown on **Attachment No. 3D, Attachment No. 7E,** Kone Elevator, Dwg. No. 823893E00, Electrical Wiring Diagrams, Drawing List, **Attachment No. 7F,** AIPHONE MASTER SENTRY, Installation Instructions and **Attachment No. 7G,** Dwg. No. 823896, Marine Elevators, Interphone System of Elevator, **Attachment 7O,** Dwg. No. 8203-646-095-05 M/V YAKIMA Refurbishment Passenger Elevator Intercom System "3MC" wiring diagram and **Attachment No. 7K** Dwg. No. 5684-095-01 M/V YAKIMA Preservation PA/GA and PBX System Arrangement and Cabling. Locate an electrical outlet in the equipment area of the elevator trunk. The AIPHONE shall be located in the EOS.

**NOTE:**

All cabling requirements, procedures, and installation shall meet the requirements for cabling as set forth in Work Item 3 and **Attachment No. 2A** of this Specification. Call buttons and indicator lights will be shipped loose to install in the new joiner work. Install Glamox fluorescent fixtures, as shown on **Attachment No. 7P**.

P. Install new elevator signage as shown on **Attachment No.7S**, Dwg. No. 8203-651-024-01 M/V YAKIMA Wayfinding Signage for New Elevator Arrangement and Details.

Q. Prepare all disturbed paint surfaces (other than KEL-KOTE areas addressed above) to an SSPC-SP 3, Power Tool Cleaning and apply one (1) coat of INTERNATIONAL Intertuf 262, Buff, at a minimum of 6 mils (DFT). Apply one (1) final coat of INTERNATIONAL Intercare 755, of matching color for area, at a minimum of 2 mils (DFT), to cover. Repair all coatings damaged by the Work to match original finish.

R. Replace all disturbed structural, thermal, and acoustical insulation to match original installation. Repair all interior finish coatings and linings damaged by the work to match original finish and treatment. Repair disturbed Passenger Deck USCG A-30 structural fire protection underlayment to a level deck configuration and renew deck coverings to match original.

S. TESTING

1. Conduct a vacuum box test on the new deck inserts. No leakage is allowed.

2. WSF will provide the services of a factory representative for verification of installation, start up and testing using **Attachments No. 7L,** MacGregor Test Report, and **7M**, MacGregor installation checklist as a guide. Provide certified weights for the factory representative to adjust and calibrate the elevator and for testing.

   The factory representative will be present at light off and during load testing. The Contractor shall provide a minimum of two (2) weeks notice prior to initial light off to the WSF Inspector. Testing of the elevator shall demonstrate, at a minimum, the following:

   a. Satisfactory operation of the unit at its rated speed.

   b. Proper operation of the start and stop controls at all levels.

   c. Normal operation of all alarms.

   d. Proper temperatures are maintained during the load test.

   e. Proper functioning of all safety, shutdown, and auto-start devices.

3. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices and the new power assist door opener. Demonstrate the correct operation to the WSF Inspector and Labor and Industries Inspector. The Contractor shall schedule 5 days for accomplishment of this grooming/certification and testing task.

4. Test the emergency intercom between all stations.

5. Hydro test all modified piping systems to 150% of operating pressure.

## 8. FUEL SYSTEM MODIFICATIONS
**{MAINTENANCE}**

A. Clean and gas free all spaces associated with the Work as necessary, and obtain a Marine Chemist Certificate for "SAFE FOR HOT WORK". Maintain the certificate during the course of the work. Note that the fuel tanks are required to be opened and cleaned. The Vessel will arrive with approximately 30,000 gallons on board to be disposed of.

B. Install new Fuel Oil Manifold piping as shown on **Attachment No. 8,** WSF Dwg. No. 8203-646-056-01, M.V. Yakima, Fuel Piping Upgrade**.** Remove and reinstall any interference as required. All new piping shall be of socket-welded construction. All new piping and connections to the existing system shall be tested and witnessed in accordance with USCG requirements. Flushing shall be in accordance with Gen. Note 5 of **Attachment No. 8.** New and disturbed areas shall be restored to original condition.

C. Install the new fuel manifold modifications electrical installation in accordance with the following and **Attachment No. 8A,** Square D Co., Dwg. No. W18577424-012-01, Rev. -, Wiring Diagram. Pull back existing cables for Sewage Aeration Blowers No. 1 and No. 2 connected to Panel P39 in Engine Room No. 2. Remove existing Panel P39 (Square D NEHB) and return to the Vessel Staff Engineer. Provide and install (including foundation modifications) a new Square D, Class 2110, I-Line distribution panel in it's place with the following characteristics: Type HCN, factory assembled, main lugs only, bottom entry, NEMA Type 12 enclosure, surface mount, 600 Amp mains rating, 480 Vac, 3 phase, 3 wire, 60 Hz, 18 kAIC RMS symmetric rated (fully rated), ninety-nine inches (99") total breaker mounting space, all copper current carrying parts, with ground bus and exterior, engraved phenolic label plate, white with black core. Provide thirteen (13), FA style circuit breakers, with copper lugs, three (3) pole, 100 Amp frame, 15 Amp trip and one (1), three (3) pole, 100 Amp frame, 25 Amp trip circuit breaker. Provide three (3) of the 15 Amp trip circuit breakers with a 25 Vdc UV trip coil, factory installed. The UV coils shall be separately fused within the panel. Two (2) circuit breakers (15 Amp) with voltage trips shall be used for the Sewage Aeration Blowers and shall be connected to the FR-2 circuit (Engine Room No. 2 $CO_2$ shutdown, located in the Ships Service Switchboard). Reconnect the Sewage Aeration Blowers to Circuits 1 and 2 in the new Panel P39. Update the new Panel schedule upon completion of the work.

D. Provide and install one (1) Square D, Class 8538 non-fused combination starter for the new Fuel Oil Transfer Pump. The pump operates on 480 Vac, 3 phase, 3 wire, 60 Hz power and is rated for 2 HP. Connect it to Circuit No. 3 in Panel P39 using MIL-C24643A (low smoke) cable, LSTSGU-4, and 15 Amp, UV trip circuit breaker. The UV trip in the circuit breaker shall be connected to Circuit FR-2. The controller shall be arranged for full voltage, across the line, non-reversing starting and shall be configured for LVP control see **Attachment No. 8A**. It shall be in NEMA Type 12 enclosure, NEMA Size 1 contactor, with Forms M10 and FF4T and reset pushbutton in the door of the enclosure. Provide a phenolic engraved nameplate, black with white core. Melting alloy overload heaters, sized for the motor, ambient temperature and duty shall be provided. The door shall include start and stop pushbuttons and a green motor run indicator light (push to test), all with engraved label plates. A wiring diagram shall be included on the inside of the

door. Raychem TMS floaters, or equal, shall be provided for all control wiring inside the controller. Additionally, a break glass, remote stop pushbutton shall be provided at a location specified by the WSF inspector. Provide embossed, aluminum cable tags on the newly installed cables with the cable name and type wherever the cable enters an enclosure or penetrates a deck or bulkhead. Utilize existing transits to penetrate boundaries to maintain the fire rating of the boundary. Do not open transits that are made from poured sealants.

E. Designate the existing FO Transfer Pump supplied from the Ships Service Switchboard, CKT P6, as the Dirty Oil Transfer Pump.

F. Upon satisfactory completion of the Flush and Hydrostatic test, conduct an operational test of the newly installed piping to the satisfaction of the WSF Inspector and the Vessel Staff Chief Engineer. During the operation test check the system for leaks, none allowed. Provide the WSF Inspector with three (3) written copies of the results of the test results.

**NOTE:**

All piping requirements, procedures, and installation shall meet the requirements for piping systems as set forth in **Attachment No. 2A.**

G. Provide labor, material and equipment to prepare the disturbed installation areas and new installations to SSPC-SP 3, Power Tool Cleaning. Apply one (1) coat of INTERNATIONAL, Intertuf 262, Gray, to a minimum of 6 mils (DFT). Apply one (1) coat INTERNATIONAL, Intercare 755, color to match, to a minimum of 2 mils (DFT).

H. Provide labor, material, and equipment to remove, relocate, and reinstall replace all interference as part of this modification.

## 9. SATELLITE COMPASS INSTALLATION
**{NAVIGATION}**

A. Install WSF furnished FURUNO Satellite Compass, Model SC-110 in accordance with **Attachment No. 9** WSF Dwg. No. 8103-647-094-01 MV YAKIMA, Satellite Compass Installation Wiring Diagram, **Attachment No**. **9A** WSF Dwg No. 8103-647-015-01 MV YAKIMA Antenna Foundation for SC110 Satellite Compass Location and Construction Details. RADAR and Antenna Foundation Modifications, **Attachment 9B** WSF Dwg No. 8203-646-090-05 MV YAKIMA, Pilothouse 24 VDC Distribution System Modification, and **Attachment No. 9C Fleetwide Pilothouse 24V DC Distrbution** FURUNO Satellite Compass Model SC-110 Operator's Manual.

B. Install the WSF furnished Satellite Compass Antenna on top of the #1 end mast as shown on **Attachment No. 9A.** Orientation of the antenna to the vessel fore and aft line is critical.

C. Relocate the existing radio and telephone antennas from the top of the mast to a location on the aft end of the pilot house overhead on Contractor provided foundations, exact location as designate by the WSF Construction Master. Provide and install new watertight penetrations in the aft bulkhead of the pilothouse of the size and type to allow the antenna leads to pass through.

D. Install cable run from new antenna down the mast to the aft bulkhead of the pilothouse. Provide and install new watertight penetrations in the aft bulkhead of the pilothouse of the size and type to allow the antenna leads to pass through.

E. Install the SC-1101 Processor unit in the pilot house in location designated by the WSF Rep. and as shown on **Attachment No. 9** and **Attachment No.9C.** The orientation of this unit to the vessel fore and aft line must be +or- 2.5 degrees. The unit must be mounted parallel to the base line of the vessel.

F. WSF will provide the services of an electronics Contractor to make the final terminations.

G. Prepare all areas of new installation and damaged paint affected by this item, to SSPC-SP3, Power Tool Cleaning. Coat exterior surfaces with a minimum of two 4 mil (DFT) coats of International Intertuf 262 series epoxy. Hand-stripe all edges. Topcoat with 2 mils (DFT) of International ES series epoxy, color to match existing colors. Coat interior surfaces with INTERNATIONAL INTERTUF 262, to obtain a minimum of 6 to 8 mils DFT. Hand-stripe all edges. Apply a minimum of 2 mils (DFT) International Intercare 755 finish coat to match surrounding color

## 10. WIRELESS LAN INSTALLATION
**{SECURITY}**

A. Install new fiber optic LAN and antennas as shown on **Attachment No, 10**, WSF Dwg. M/V YAKIMA Wireless Internet Installation.

**NOTE:**

Wherever new penetrations are required they shall maintain the watertight and fire ratings of the bulkhead or deck being penetrated. Existing non-poured bulkhead and deck penetrations may be reused. New Multi-Cable Transits shall be Nelson type. Test all deck, bulkhead and hull penetrations in company with and to the satisfaction of the USCG and WSF Inspector, and the Staff Chief Engineer.

B. Install new cables required by **Attachment Nos. 10**. Insure cables and wires installed by this ITEM are run and marked, and continuity tests are made in accordance with **Attachment No. 2A**.

C. Install foundations and antennas as required on **Attachment No. 10**, welding shall be in accordance with **Attachment No. 2A.**

D. WSF will provide the services of a licensed electronics Contractor to mount the OFE equipment, perform final terminations and system check out.

E. Prepare all surfaces affected by this work to an SSPC-SP3, Power Tool Cleaning. Furnish and apply one (1) anticorrosive coat, International Intertuf 262, to obtain a minimum of 6 to 8 mils (DFT) to all new surfaces and prepared surfaces. Hand-stripe all edges. Topcoat with International Intercare 755, to a minimum of 2 mils (DFT) to match surrounding surfaces.

## 11. DEADWEIGHT SURVEY / STABILITY TEST
**{NON-LIFE CYCLE}**

A. Upon completion of all contract production work the Contractor shall conduct a Deadweight Survey witnessed by the WSF Inspector and USCG Representative. Prepare the deadweight survey report using the General Hydrostatics (GHS) computer software published by Creative Systems, Port Townsend Washington, and submit copies to the USCG and WSF Inspector for approval. The GHS geometry file is available from WSF. The Contractor shall include in this submittal exact 3½ inch DS/HD disk magnetic media or CD files of both the report and supporting data

B. Submittal of the report to the USCG and WSF shall take place no later than five (5) calendar days after the completion of the deadweight survey.

C. Prepare and provide a new Trim and Stability Booklet using the data provided by the deadweight survey. Submittal of the Trim and Stability Booklet to the USCG and WSF shall take place no later than ten (10) calendar days after the completion of the deadweight survey.

D. Final Acceptance, as defined in Contract Volume I, will not be executed until submission of the USCG approved Stability Test Data Report and Trim and Stability Booklet and the USCG has issued a Stability Letter in accordance with 46CFR 170.110 .

## 12. DOCK AND SEA TRIALS
**{MAJOR MECHANICAL}**

**NOTE:**
For scheduling purposes, assume Dock Trials will take two (2), ten (10) hour days.

A. WSF will provide deck and engine room trial crews. WSF will provide fuel for dock and sea trials. WSF will require one (1) workday to on load fuel and calibrate tanks prior to trials. The Contractor shall provide a boom for fuel on load if required by the facility.

B. The Contractor shall provide support services for Dock Trials, to be conducted by the Vessel personnel.

C. The Dock Trials of the propulsion controls shall be under the direction of the Vessel Staff Chief Engineer and to the satisfaction of the USCG Inspector, and the Vessel staff Chief Engineer.

D. The Dock Trials of the steering control system shall be under the direction of the Vessel Staff Chief Engineer and to the satisfaction of the Matthews Marine representative, the Vessel Staff Chief Engineer, and the USCG Inspector.

E. The Dock Trials of the new generators, Switchboard/MCC/AMS, new elevator, and watertight door automation/indication installations shall be under the direction of the Vessel Staff Chief Engineer and to the satisfaction of the USCG and WSF Inspector, and the Vessel Staff Chief Engineer and include the completion of the control system design verification test.

**NOTE:**
For bidding purposes, assume 100 labor hours will be required in support of the Dock Trial exclusive of deck crews to handle lines. The Contract will be adjusted upward or downward, using the actual hours expended.

**NOTE:**
For scheduling purposes, assume Sea Trials will take one (1) ten (10) hour day.

F. The Contractor shall provide support services including tug and berthing services for Sea Trials, to be conducted by the Vessel personnel. For bidding purposes, assume that in addition to normal berthing tug assist a standby tug will be required to accompany the Vessel during the sea trials. The Contract will be adjusted upward or downward depending on actual standby services rendered.

G. WSF will provide deck and engine room trial crews. WSF will provide fuel for dock and sea trials.

H. The Contractor shall provide the services of a qualified compass adjustor to adjust and compensate magnetic compasses in No. 1 and No. 2 Pilothouses. WSF will swing ship during sea trials to accommodate the compass adjustments.

I. The Sea Trials of the main engines and propulsion controls shall be under the direction of the Vessel Staff Chief Engineer. These trials will demonstrate the performance of the engine control system and.

J. The Sea Trials of the steering control system shall be under the direction of the Vessel Staff Chief Engineer and to the satisfaction of the Matthews Marine representative, the Vessel Staff Chief Engineer, and the USCG Inspector.

**NOTE:**
**FOR BIDDING PURPOSES, ASSUME 120 LABOR HOURS WILL BE REQUIRED IN SUPPORT OF THE SEA TRIAL EXCLUSIVE OF DECK CREWS. THE CONTRACT WILL BE ADJUSTED UPWARD OR DOWNWARD, USING THE ACTUAL HOURS EXPENDED.**

## 13. ADA COMPLIANCE UPGRADES

**{REGULATORY COMPLIANCE ADA}**

A. Designate a new Mobility Impaired Passenger Priority Parking space on the lower and upper vehicle decks adjacent to elevator as shown on **Attachment No. 13**, WSF Dwg. No. M/V YAKIMA Priority Parking and Mobility Impaired Passengers and MES Routing Mods Marking Arrangement**.** Upon completion of the elevator installation restripe the MES station as shown on **Attachment No. 13**. Prepare the new striping area to SSPC-SP6, Commercial Blast Cleaning. Apply one (1) coat of INTERNATIONAL, Intertuf 262, Gray, a minimum of 6 mils (DFT) to the line area. Provide labor, material and equipment to apply one (1) spot coat AMERON, Amercoat 237M, Dark Gray, a minimum of 22 mils (DFT). Repair non-skid coatings at new striping area by applying non-skid while the Intertuf tack coat is still “thumbnail soft”. Paint the new striping using INTERNATIONAL, Intercare 755, Light Blue, a minimum of 2 mils (DFT), to cover.

**NOTE:**

The intent of this specification is to apply the Intertuf coating only under the line and non-skid areas. Any Intertuf intrusion onto the existing deck zinc coat shall be prepared and recoated with the proper zinc coat.

B. Install ramps in way of the sills on doors to the weather at each end of the cabin/dining area, and at weather door at elevator, where the existing difference in elevation between the deck and the top of the sill is greater than ½", provide a built-up ramp with a 4:1 slope, the full width of the door on the weather side. The ramps shall be made from PolySpec Lite Latex. After curing, coat the ramps with non-skid, color to match existing. Before applying PolySpec, prepare the deck in accordance with the manufacturer's recommendations.

C. Modify coat hooks in way of the designated wheelchair spaces on the LPD and the UPD, remove the nearest coat hooks (8 places) and relocate them in the same area as directed by the WSF representative, 48" above the deck. Cover the existing holes for the hooks with stainless steel screws.

D. Install Braille signs for each interior door on the LPD and the UPD, provide a Braille sign with text identical to the sign on or adjacent to the door. The spaces involved are as follows:

On the LPD: Cleaning Gear Locker, Deck Gear locker, Ship's Office, Men's Restroom, Mobility Impaired Restroom, Women's Restroom.

On the UPD: Men's Restroom, Women's Restroom, Cleaning Gear Locker, Fan Room (2), Galley (2).

## 14. BILGE PAINTING
**[MAINTENANCE]**

A. Coordinate the bilge painting with engine room removals. Areas to be preserved:

1. In each engine room; the area from the deck plate level and below from Frame 20 to Frame 26 including all structure and foundations including the tops of beams and deck plate structure.

B. The areas to be preserved in the engine rooms shall be treated by preparation and painting using the following system:

1. Thoroughly degrease and clean the areas to be preserved by a water wash to SSPC-SP 12/NACE 5 Low Pressure Water Cleaning (LP WC) WJ-3.

2. Prepare areas of failed coating to SSPC-SP 3 Power Tool Cleaning,

3. Thoroughly clean the areas described in paragraph "A" to by a water wash to SSPC-SP 12/NACE 5 Low Pressure Water Cleaning (LP WC) WJ-3 using International GMA.

4. Paint SSPC-SP 3 prepared areas with one (1) coat of Ameron Amercoat 235, to obtain minimum 6 mils (DFT) minimum. Hand stripe all edges. Color to be tinted different than existing coating.

5. Paint all of the areas described paragraph "A" with one (1) coat of Ameron Amercoat 235, to obtain minimum 6 mils (DFT). Color to be tinted to match existing coating.

**NOTE**:

For bidding purposes assume room 500 sq ft of failed coating requiring SSPC-SP 3 preparation and coating in each engine room. The Contract Price will be adjusted upwards or downwards to reflect any difference in area of failed coating.

## 15. ENGINE CREW DAYROOM MODIFICATIONS
**[MAINTENANCE]**

A. Modify the Engine Crew Day Room clean and gas free all spaces associated with the Work, as necessary, and obtain a Marine Chemist Certificate for "SAFE FOR WORKERS", and "SAFE FOR HOT WORK" for same. Maintain the certificate during the course of the Work. **Attachment No. 15**, WSF Dwg. No. 8203-646-001-03 shows the existing arrangement.

B. Remove the existing table benches, microwave and cabinet unit located on the backside of the ship service switchboard as shown on the existing arrangement on **Attachment No. 15**. Modify electrical service to suit new equipment installations. Repair, replace floor tile to match existing floor tile. Turn over the removed microwave to the Vessel Staff Chief Engineer for disposition.

C. All equipment, cabinets, counters and shelving shall be installed parallel to the baseline and level transversely.

D. Sub-bases and cabinets shall be of rigid and durable construction. Construction details of prefabricated and custom built equipment shall provide for the elimination of sharp edges and corners, the removal of all burrs which might cause personnel injury or an unaesthetic appearance to the installed cabinets and appliances, or hamper cleaning and maintenance. Sub-bases shall be connected to the steel deck with welded studs. The sub-bases shall be installed on top of the deck insulation and deck covering. Sub-bases shall finish approximately 3½ inches above the finished deck, and approximately four inches (4”) in from the front edge of the cabinets and equipment. Neoprene gaskets shall be provided between the sub base and any equipment mounted thereon. Care shall be taken to isolate steel sub bases from aluminum cabinets. Cabinets shall be installed in a manner that will present the appearance of an integral unit insofar as practicable. All base cabinets shall be securely bolted to the sub base through a watertight neoprene gasket utilizing stainless steel bolts, nuts and washers as required. Microwave unit shall be securely bolted into bulkhead structure.

E. Cabinets shall be Design Built LLC. or equal. Cases and shelving shall be constructed of 5052-H32 aluminum sheets, 0.090-inch thickness with welded construction. Cabinet interiors will be powder coated. Cabinet exteriors shall be covered Wilsonart D50-60 Khaki Brown. Shelves shall be removable and shall have lee rail. The cabinet assembly shall be 16” deep, 5’ high and 8’ long consisting of four (4) individual units each with four (4) shelves and door. Above the unit mount a bookcase the length of the cabinet and 3’ tall with adjustable shelves.

F. Cabinets shall be fabricated with enclosed tops, sides, backs and fronts. Doors shall be provided with stainless steel piano hinges, handles and latches. Cabinet door pulls shall be stainless steel paddle latches, Southco 100 Series, or equal. Shelving guides shall be Knape & Vogt No. K255 ALM, with No. K256AL aluminum shelf supports.

G. Install a Microwave Oven - General Electric Model Number JVM1660SB 1.6 cubic foot microwave oven, or equal, above existing stove. Finish is white with stainless steel trim. Microwave oven shall be equipped with integral 300 CFM, two-speed exhaust fan and General Electric Model Number JX81A recirculating charcoal filter kit.

H. Cable sizes for new or reused existing cable shall be of sufficient size to ensure that the maximum voltage drop from the ships service distribution switchboard to the furthest load does not exceed 6% and that the available fault current at the load is sufficient to assure proper clearing of circuit breakers and protection of installed cables against prolonged over current as a result of insufficient circuit breaker clearing currents. Reuse the existing breaker to supply power to the new microwave unit.

I. Modify the benches and table by shortening by twelve inches (12”). Recover the benches to match the existing material.

## 16. SECURITY SYSTEM INSTALLATION
**{SECURITY}**

A. Install security modifications shown on **Attachment No. 16 thru 16E**. Note WSF supplied items on **Attachment No. 16B** and listed in **Attachment No. 2B**.

B. Remove one ladder designated by the WSF Inspector from each end. Fill in the railing using schedule 40 galvanized 1¼ inch pipe as shown on **Attachment No. 16D**.

C. Enclose the remaining ladder at each end with a wire mesh enclosure. The uprights shall be 1½ inch schedule 40 galvanized pipe and shall reach from the upper passenger deck to the underside of the Texas deck. The enclosure shall extend 3 feet beyond the base of the ladder to provide a landing. The wire screen for the enclosure shall be stainless steel .12 x ½” x ½”. The door will swing out onto the Upper passenger cabin deck.

D. Prior to welding to the upper passenger deck remove the insulation from the overhead of the lower passenger cabin. Restore the insulation when all work is completed.

E. The lock sets will be provided by WSF.

**NOTE:**
Wherever new penetrations are required they shall maintain the watertight and fire ratings of the bulkhead or deck being penetrated. Existing non-poured bulkhead and deck penetrations may be reused New Multi-Cable Transits shall be Nelson type. Test all deck, bulkhead and hull penetrations in company with and to the satisfaction of the USCG and WSF Inspector, and the Staff Chief Engineer.

F. Fabricate equipment cabinet and electronic security devices foundations and camera mounts in the locations shown on **Attachment No. 16**, WSF Dwg. No. 8203-639-095-01.

G. Install new cables required by **Attachment No.’s 16, 16A, 16B, 16 C and 16D**. Insure cables and wires installed by this ITEM are run and marked, and continuity tests are made in accordance with **Attachment 2A**.

H. Obtain the services of ABSCO Alarms (206) 367-1166 to make all connections and demonstrate the operation of the system.

I. Install stud runs and penetrations, run cables and install the security hardware and electrical components as shown on **Attachment No. 16B**.

J. Install the ventilation system for the security room as shown on **Attachment No. 16 E.**

K. Replace all disturbed structural, thermal, and acoustical insulation to match original installation.

L. Prepare all surfaces affected by this work to an SSPC-SP3, Power Tool Cleaning. Apply one (1) anticorrosive coat, International Intertuf 262, to obtain 6 to 8 mils (DFT) to all new surfaces and prepared surfaces. Hand-stripe all edges. Top-coat with International Intercare 755, to a minimum of 2 mils (DFT) to match surrounding surfaces.

## 17. FAN MOTOR CONTROL CENTERS (MCC2-5) INSTALLATIONS
**{MAJOR MECHANICAL/ELECTRICAL SYSTEMS}**

A. The Work Item describes the installation of a WSF furnished replacement for the MOTOR CONTROL CENTER's (MCC) 2 thru 5. The owner furnished material is listed in **Attachment No. 2B**. The Contractor shall pick up the motor control centers at the WSF warehouse on 6th a WSF Dwg. 8203-646-074-01, M.V. Yakima, Generator Replacement Mchry Arr & Piping Mods Ave.

B. Remove the existing MCC's and replace them with new, WSF Furnished as shown in **Attachment No. 3D,** WSF Dwg. No. 8203-646-090-01, M.V. Yakima Electrical One-Line Diagram.

C. The installation of the new motor control centers should be coordinated with the installation of the new switchboard, MCC 1 and the AMS in the EOS addressed in Work Item No. 4, No. 5 and No. 6.

D. Note and map the location of all interferences prior to removal of the MCC's. Remove all necessary interferences and reinstall on completion of work. Protect all areas in the vicinity of hot work. Moved and/or reinstalled interferences will be re-insulated and preserved in same manner as original installation.

E. Disconnect all ship's wiring from the existing MCC's and other components to be replaced or relocated including the power panels shown on **Attachment No. 3D.** Carefully document all connections. Protect cables from damage during the removal and installation of the new MCC's. Reconnect all cabling to be retained and test for proper operation.

F. Modify the existing foundations to land the new MCC's.

G. Megger test and continuity check all new and reused cable associated with Work under this Contract provide the results to the WSF Inspector.

**NOTE:**

All cabling requirements, procedures, and installation shall meet the requirements for cabling as set forth in Work Item 3 and **Attachment No. 2A** of this Specification.

H. Install fiber optic cable from MCC No.1 section of the switchboard in a ring configuration to MCC's 2 thru 5 for termination in the ET200M's as shown on **Attachment No. 3D**.

I. Prepare all areas of new installation and damaged paint affected by this Item, to SSPC-SP 3, Power Tool Cleaning. Coat all prepared surfaces with INTERNATIONAL, Intertuf 262 a minimum of 6 mils (DFT). Use INTERNATIONAL, Intertuf 262 to a minimum of 5 mils (DFT) on all edges. Apply a minimum of 2 mils, (DFT), of INTERNATIONAL, Intercare 755 finish coat to match surrounding color.

J. Replace all disturbed structural, thermal, and acoustical insulation to match original installation.

K. Verify that all installed systems operate as intended. This includes all system components, all safety devices, and all alarms, monitoring, and control devices.

L. The installation/operational testing of the MCC's shall include, but not be limited to, the following:

Verify that the MCC installation hook-up is in accordance with the Technical Specifications and drawings.

Check bonding (grounding) of cubicles and components of cubicles.

Check availability and marking of components in accordance with the relevant drawings.

Verify the wire size and wire markers of all installed wires and cables.

**(END)**