

PRIVILEGED INFORMATION

SPECIFICATIONS

FOR A

2000 HP TWIN PROPELLER CONVENTIONAL
PUSHBOAT

MEASURING 78' X 34' X 10'

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SECTION I - GENERAL

101 INTENT:

It is the intent of these specifications and plans that the BUILDER shall deliver to PURCHASER, a towboat complete in all respect, ready for operation, fully equipped, and fitted out in accordance with best commercial marine practice, complying with all the applicable requirements of the several regulatory bodies of the United States listed herein, and ready for the service intended.

102 PLANS:

The following plans will be provided in advance and will be attached to the contract:

Outboard Profile:	Entech 360-G01-01
General Arrangement:	Entech 360-G02-01
Tank Arrangement:	Entech 360 G03-01
Structural Plan and Profile:	Entech 360-S01-01
Docking Plan:	Entech 360-G05-01

Upon completion of this contract the PURCHASER will be furnished two complete sets of "as built" drawings within 30 days.

103 CERTIFICATION:

Necessary certificates and documents covering the approval and indicating compliance with the regulatory bodies shall be obtained by the BUILDER at his own expense. The original certificates and documents shall be mounted on board the craft as required by the issuing agency or directed by the PURCHASER'S representative. Currently those certificates and documents consist of the USCG Certificate of Documentation (COD) and the executed USCG Bill of Sale (CG-1340).

104 HULL CHARACTERISTICS;

Length Overall	78' - 0"
Beam Molded	34' - 0" Depth
Molded	10' - 0" Design Draft
8' - 2"	
Eye Height	29' - 0"

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105 DEFINITIONS:

Wherever the words defined in this paragraph, or pronouns used in their stead, occur in these specifications, they have the following meanings:

1. Purchaser shall hereafter be referred to as PURCHASER.
2. The words "approval of the PURCHASERS" or "approved by the PURCHASERS" shall mean as approved in by the PURCHASER or his designated agent.
3. The words "provide and install" shall be taken to mean that the BUILDER shall provide and install the specified material and equipment, even though one of the words only is used.

106 INSPECTION:

All work and material entering into the construction of the vessel and its machinery, fittings and equipment shall be subject at all times to the inspection by the PURCHASER, or his agent. Any work not satisfactory either from defective material, departure from specifications, or poor workmanship, shall be removed or replaced to the satisfaction of the Inspector at the BUILDER'S expense.

The PURCHASER, or his agent, and any person employed by the same shall be allowed access to the work at any time during the regular working hours of the BUILDER or at such other times as will not entail additional expense to the BUILDER. The BUILDER shall furnish all reasonable facilities and give reasonable time for such inspection.

107 MATERIALS:

All materials intended for use, and all equipment used, shall be as specified or as shown on plans, except on written order from the Inspector, and should the BUILDER desire to substitute any material or equipment for the specified, he must first obtain an order from the Inspector in writing.

Steel plate, shapes and other metal work shall be of the best quality for its particular purpose.

Paints, electrical equipment, wiring, machinery, outfitting and all other equipment entering into the construction or for installation shall conform to the standards of first class material for commercial vessels of this class and as specified herein.

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All wood used must be properly seasoned and selected for the particular use to which it is to be put.

Plywood shall be marine type in all cases.

108 WORKMANSHIP:

Workmanship throughout shall be first class and high grade, and in all respects suitable for the intended use. Particular care shall be taken to insure fair lines, adequate and proper fastening, suitable butts and scraps, smooth surfaces, neat and substantial work and maximum degree of water-tightness. All welding shall be done by competent welders. All plating shall be free of uneven and wavy lines or wrinkles after welding.

The installation of machinery, fittings and equipment shall be carried out in the latest approved marine fashion equal to the best modern practice, and as specified herein.

109 ALTERATION AND CHANGES:

The PURCHASER reserves the right to make any additions to the work to be performed without invalidating the CONTRACT. Any change in cost due to alteration requested by the PURCHASER shall be negotiated prior to accomplishment. If change involves a delay in completion, the time of completion shall be extended.

The BUILDER may substitute other sizes and types of material for that specified, providing the same is of equal quality, strength and suitability for the use intended and that the PURCHASER'S approval is obtained, via the Inspector, in writing. No increase in cost shall be made for any such change.

110 MATERIALS SUPPLIED BY PURCHASER:

The BUILDER will receive, unload, store, place on the boat, and install without extra charge all material, machinery, and equipment hereafter specified as being supplied by PURCHASER, as listed below:

111 BUILDER FURNISHED ITEMS:

Two Cummins QSK38-MI Tier 3 Marine Engines with Twin Disc EC300 throttles Two reduction gears – Twin Disc H65321 – 5.96:1

Two (60KW John Deere Marine Keel Cool Generator Sets 4045TFM85 99HP 1800 RPM, with gauge panels, mounting brackets and battery system

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Two Sound Propellers “Dominator” style – Class II, RH & LH, SS, 6” SAE
std. bore, 4-blade, .89 DAR, 73”x58” with non-singing edges
One 14 x 48 skiff with 9.8 outboard motor
All navigation equipment including 12 volt battery network including
installation
Two pilot house console instrument panels
Captain’s chair
Six galley table chairs
Black out shades Name
boards
Chart table
Paint locker with fire extinguisher
Shore power disconnect switch panel and breaker
Pilot house shades
Extend the davit
Fire and Engine Alarm
Extra conduit for future electrical wiring from the engine room to the pilot house
Air actuated fuel shut off valves mounted in a fiber glass enclosure and fuel tank stick
gauges mounted in a bolted flange – complete with stainless
steel bolts and Teflon coated nuts - raised off the main deck just enough to clear the
water tight galley doors (about six (6) inches off the main deck to the center of the
flange).
Potable water filter housings
Hydraulic steering complete with stainless steel piping and fittings. Double
blocked rams - complete with Thorplex bushings
Winch frames and covers
Deep kitchen double draining sink
In line under counter water heater under the galley sink
Bunk ladders
Pillow top mattresses
Demisters, Algae – X filter housings, centrifuge filter housings
Two (2) – 6” Simplex tail shaft seals complete with stainless steel adaptor
plates, strainers and stainless steel piping and fittings.
Fuel shut off water proof junction box, and reduction gear oil tray, if
applicable.
Furnish and install wax tape on all winch and all steering hose fittings.
Stainless Steel 3/8” valves for the Simplex tail shaft seals. Stainless
Steel pipe for the air compressor drains.
Two (2) stainless steel 2” gate valves mounted to the main air lines.
Two (2) NUMAR - PT 25 battery chargers complete with battery boxes mounted
above the deck plates, deep sea on/off switches, toggle circuit breaker switches
TYCO 20 amp with hinged covers to complete the installation of the 12 volt
battery network for the generator engines in the lower engine room.
Two (2) stack logos mounted with stainless steel fasteners to the stack.

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Two (2) ASCO Red Hat ASCO Grainger part # JC 52 solenoids.

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- Two (2) Dayton Grainger # 4VYZ5 limit switches for the mast pole.
- Clothes washer and dryer
- A mat for the PURCHASER furnished pilot house chair
- New segregated containment boxes as agreed
- Hose with quick connect on engine drains
- Paint safety yellow between fixed chocks and winches
- Segregated water pump switches
- Elbow drain at deck 2 & 3 corners and eliminate exhaust stack vents

112 TRIALS AND TESTS:

On completion of the craft and prior to the underway trials, all machinery, piping, electrical systems, fire-fighting systems, and life saving equipment shall be thoroughly tested in accordance with these specifications and the requirements of the U.S.C.G. to demonstrate proper working order and that all requirements of the specifications have been fulfilled. Any defects which may develop or become apparent in connection with the work covered herein shall be corrected by the BUILDER. The results of all tests shall be recorded. USCG inspection will not be part of the BUILDER'S scope.

When the craft is in all respects ready for delivery to the PURCHASER, the BUILDER shall conduct acceptance trials in accordance with an agenda prepared by the BUILDER and approved by the PURCHASER. PURCHASER provides fuel and BUILDER gives credit for 5,000 gallons, at cost to PURCHASER to be deducted at final billing.

112 GUARANTEE:

BUILDER will replace or make repairs for all parts of the hull, outfit machinery etc., which fail as a result of defective material, workmanship design which may occur within One (1) Year from date of delivery to PURCHASER. With respect to equipment purchased from others and incorporated in the tugboat, the BUILDER will be responsible only to the extent of the usual warranty or guarantee of the manufacturer or supplier of such equipment. It is understood that this does not cover ordinary wear and tear or accident beyond the control of the BUILDER, and the BUILDER will not be liable for contingent or consequential damages resulting from aforesaid failures.

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SECTION II - HULL CONSTRUCTION

201 GENERAL:

The hull will be constructed on transverse framing system. The hull will be double chine design assuring good entry and water flow to the propellers.

Stanchions and supports will be provided where required to support concentrated loads, deck machinery, etc. Swash plates will be furnished in tanks where required. Limber and vent holes to be cut in floors, keelson, longitudinals, etc., to provide sufficient drainage and venting of all compartments.

202 WELDING:

Welding procedures will be carried out to A.B.S. and U.S.C.G regulatory guidelines. The amount of welding on the boat shall be so carried out as to reduce the buckling of plating both in hull and deckhouse to a minimum. Unsightly buckles and weld seams will be removed. All tanks will be air tested and witnessed by the PURCHASER'S representative. ABS and USCG will not be required to inspect construction.

203 HULL CONSTRUCTION:

The hull plating will meet or exceed the specifications detailed on the plans referred to in section 102 of this document which is attached to the contract.

204 DECK FITTINGS:

Deck fittings of cast steel or approved weldments are to be furnished and installed as shown on drawings. The double bitts shall have a minimum O.D. of 8". Deck is to be reinforced with double plates under all fittings. Bow and stern bitts will be located as shown on drawings. There shall be two sets of Nabrico DF465 SS button chocks (total of 4) 1 set DF460-3 installed as shown on the plans and elevated as per PURCHASER requirements. Fingernails shall be installed port and starboard as directed.

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205 MANHOLES:

Watertight manholes shall be located as shown. Manholes in the engine room and in the forward hold to Fuel Oil, Lube oil, Dirty oil, and water tanks shall be 15" x 23" bolted type (DF 501 15"x23"). Single bolted flush mounting – (DF 430 -18") galvanized hatches shall be provided, one on the forepeak tank, two each on the ballast, lazarette and fresh water tanks.

206 FENDERS:

Two (2) fenders fabricated from one half 6" Schedule 80 pipe shall be installed by continuous welding to the hull as shown on drawings.

207 TOW KNEES:

There shall be two tow knees located at the bow of the vessel. The knees shall be fabricated using 1/2" vertical plates; 3/4" face plate; 3/8" diaphragms, and steps to the top of the knees. The overall length of the tow knees is sixteen feet (16'). The tow knees shall extend approximately 12' - 6" above the D.W.L. and 6" below. Each tow knee will have a 16"x36" hinged door with latch on the inboard vertical plate for access to the inside of the tow knee. In addition, a 4"x14" vent will be installed inside each tow knee with expanded metal screens for venting in to the forward hold. The tow knees shall be faced with M & M type Bumpers (or suitable substitute) tow knee pusher plates; 36" wide. The head log between the knees shall have 10" wide bumpers mounted horizontally.

208 BULWARKS:

There shall be 18" high bulwarks around perimeter of the hull. The bulwarks shall be fabricated from 3/8" plate with a 6" x 1/2" F.B. cap. There shall be 3/8" plate brackets located on every other frame. All welding on bulwarks shall be continuous.

209 RUBBER FENDERS:

There shall be "cut-tire" type fenders similar to those manufactured by M&M Bumper, Inc. (or suitable substitute) installed on fore and aft corners and three 1' x 4' pads on port and starboard sides. Rubber fenders will be provided on boarding wings on Fleet also.

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SECTION III - DECK HOUSES AND PILOTHOUSE

301 GENERAL:

The deck houses are to be of steel construction as shown on plans, sides 1/4" and roof plating 1/4" with suitable angle or flat bar stiffeners.

302 HAND RAILS, LADDERS, AND STAIRWAYS:

Pipe handrails shall be provided as shown on contract plans. The stanchions shall be 3/8" x 3" F.B.; the top rail and intermediate rails shall be 1 1/4" pipe sch. 40 steel pipe.

There shall be a 1 1/4" steel pipe grab rail around main deck house perimeter.

There shall be a stairway into forward storage hold, from main deck to boat deck and a vertical ladder from Texas deck to top of pilothouse. The ladder shall be fabricated from 2" x 1/4" F.B. with 3/4" steel bar rungs. It will be offset at the base as specified by the PURCHASER.

There shall be an exterior stairway from the Texas deck to the boat deck at on the port side. There shall be internal stairways from main deck to boat deck. There is also a stairway from the upper engine room to the lower engine room.

303 FLOORS AND GRATINGS:

Checkered aluminum floor plates, 3/16" thick will be provided in engine room to entirely cover engine room, except in way of main engines and auxiliary machinery held in place by 1/4" stainless steel countersunk screws.

304 DOORS AND WINDOWS:

All main decks out side doors will be watertight four dog aluminum construction. Pilothouse and boat deck doors will be weather tight aluminum construction with a 3" sill. The water tight four dog aluminum door on the port side of the galley will be 36"x66".

Interior cabin doors will be of 1 3/8" wood, except door between main deck quarters and engine room. This door shall be an insulated steel joiner door.

Windows shall be fitted in pilothouse as indicated on the plans. All windows except door units will be marine grade Aluminum with tint. Doors

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will be rubber sealed fixed. The main deck cabin shall be equipped with fixed lights as shown on plan (rubber set).

One (1) motor driven pendulum type outside mounted Vetus Company, windshield wiper shall be installed on the center forward pilothouse window.

305 HARDWARE:

All hardware, including locks, hinges, and hooks stops, to be of Perko substantial pattern.

306 DECKS:

A Hawser deck shall be installed on aft deck over tiller arms will be covered with fiberglass grating. Guards will be installed at steering rods. All grating fasteners to be stainless steel quality.

A walkway will be installed from Texas deck to push knee and will be covered with fiberglass grating and secured with galvanized fasteners. The push knee steps will have fiberglass steps and secured with galvanized fasteners. The catwalk over the AC units will have fiber glass grating and secured with galvanized fasteners.

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SECTION IV - PROPULSION & STEERING

401 MAIN ENGINES: (FURNISHED BY BUILDER)

The BUILDER shall, install, and properly align two (2) Cummins QSK38-MI Tier 3 marine engines and Twin Disc MG5321 reduction gears.

402 STACK:

Stack to be constructed of 1/4" steel plate, oval section, of dimension as shown. BUILDER furnished insignia of metal carried on outboard sides of stack. Stack to be fitted with exhaust fan for ventilation of stack and engine room.

403 ENGINE COOLING SYSTEM:

The main engines will be provided with Fernstrum coolers fitted into a recess in hull in way of engine room as follows:

Fernstrum Model D1869 for QSK38-MI jacket water, Fernstrum Model D2281U for QOK38-MI AC and gear and Fernstrum Model CN893U for the generators.

404 PROPELLER SHAFTS AND COUPLINGS:

Propeller shafts shall be Aqua met 17 of proper size to satisfy torsional vibration requirements of the engine manufacturer but not less than 6" diameter shall be furnished and installed as shown on Entech drawing # 360-M02-01-revision 2.

405 STERN TUBES & SHAFT STRUTS:

There shall be provided stern tubes fabricated from steel seamless mechanical tubing with 2 1/2" wall. The stuffing boxes shall be of shaft seal design, (BUILDER furnished Wartsila) shipyard installed. Scoops and stainless steel adaptor plates will be furnished and installed on the side shell P & S complete with SS coupling – piping, valves and fittings at side, by the BUILDER. The tail shaft seals will be installed with Perko strainers to the scoops with stainless steel lines and fittings. The vents will be copper tubing with stainless steel fittings.

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The struts shall be fabricated "V" type suitable to house 6" flanged rubber cutlass bearings.

406 PROPELLERS: (FURNISHED BY BUILDER)

Two (2) solid stainless steel propellers shall have four (4) blades and to be approximately 73" diameter. The pitch and blade area of the propellers to be such as to fully develop the horsepower of the engine under full load (58 pitch with .89 DAR). Manufacturer shall be sound.

Propellers to have smooth finish all over and to be carefully balanced. Bearing housing of strut to be same O.D. as propeller hub.

407 RUDDERS:

Two (2) steering rudders of the shape and location as shown on contract plans shall be furnished and installed. The stocks shall be cold roll diameter (7") with stainless weldment. The main rudder blades will be provided as shown on the drawing Entech # 360-MO3-01. However, the dimensions of the flanking rudder blades have changed as follows; 42" wide by 52" high on the front edge and 60" high on the trailing edge.

Bearings shall be housed in heavy steel tubing the rudder tubes shall be fitted with Simplex composite bearings. Rudder stocks shall be in single piece without palms. The bearings shall carry rudder weight as well as lateral load. The carrier and bearings shall have no grease fittings. The quadrants and tiller arms shall be keyed to the stock above the rudder tubes. Jockey bars and other pins and socket shall be Thorplas nylon material bushing. The steering rams and associated equipment shall be located above the main deck and shall have rod eye ends instead of clevis type.

The main rudder jockey bar will be 4"x 4" sch. 80 mild steel tubing. The flanking rudders (4), tubes, tillers, jockey bars, etc. shall be similar in construction to steering rudders except stocks will be 6" in lieu of 7". Builder will furnish main rudder stock pucker seals from Gator Machine Shop.

408 STEERING GEAR:

Shall be as per the Custom Hydraulic spec dated 10-11-02.

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SECTION V - AUXILIARIES

501 SHIPS SERVICE GENERATORS:

The ships service generators shall be furnished and installed by BUILDER as specified in the electrical section.

502 PUMPS:

All pump equipment shall be of high quality, commercial marine standard. The pump unit shall be furnished and installed by the BUILDER as follows:

1. Bilge & Ballast Pump: Two (2) self-priming Barnes 5 CCE self priming centrifugal pump, close-coupled to a 3 h.p.,208 volt, 3 phase, 3500 rpm drip-proof marine motor with a capacity of 190 GPM at 50 PSI discharge pressure.
2. Fuel Transfer Pump: one – MP brand model number 36296 – P0 8 - 2” USCG approved self priming pump with motor.
3. Potable Water Pressure Set: Two – ½ HP Jacuzzi # C55 CX 62H with Emerson motor - complete with one twenty gallon tank, pressure gauge and relief valve.
4. Sanitary Water Pressure Set: One - ½ HP Jacuzzi # C55 CX 62H with Emerson motor - complete with one twenty gallon tank, pressure gauge and relief valve.
5. Compressed Air System: Two (2) electric motor driven air compressors, Champion or equal, 5 H.P. 208 volt, 60 cycle, 3 phase, with 2 air tanks 60 gallon each capacity designed for 200 PSI working pressure.
6. Stuffing box sump pumps: Submersible – Little Giant 1/3 H P. model # 6E C1A SFS electric pumps with float switches.
7. Dirty oil pump shall be of 1” air diaphragm type Weldon-MODEL # m 279550Grainger part # 6PY44.
8. Fire pump:7 ½ HP –Byrne Rice and Turner-#mp35764 - skid mounted will be installed to PURCHASER’S specifications complete with remote switch outside the engine room door.

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SECTION VI ELECTRICAL

601 GENERATORS:

The BUILDER shall install two (2) 60KW Packaged Marine Keel Cool Generator Sets 4045TFM85 99HP 1800 RPM, EPA Commercial Marine Tier III, IMO MARPOL Annex VI Compliant

602 SWITCHBOARD AND DISTRIBUTION PANELS:

The power panel will be BUILDER furnished for non-parallel operation of generators. Distribution panels with necessary spare circuits will be furnished and installed as follows:

- One (1) 208 Volt engine room panel
- One (1) 120 Volt engine room panel
- One (1) 120 Volt pilothouse panel; on the port side forward of A/C duct or in the crawl space under the pilot house. One
- (1) 120/208 Volt Galley panel
- One (1) Low voltage system for the General Alarm

603 WIRING:

All power wiring shall be IEE45 cable. Separate circuits will be provided for pilothouse searchlights, living quarters, galley, galley range, engine room, and all motors of one or greater horsepower. All interior switches shall be not watertight. The wiring under console will be ring type connections. A spare 2" PVC conduit will be run from the pilot house to the engine room for future service.

604 SHORE POWER CONNECTION:

A single throw 100 amp square D disconnect switch will be provided and mounted in the engine room by the main breaker panel as specified by the PURCHASER. A BUILDER furnished water tight junction box will be mounted in the side of the engine room bulkhead as per Purchaser's specification.

605 LIGHTING:

Storeroom, deck lights and engine room lights to be guarded, watertight, approved fixtures equal to Pauluhn fiberglass fixtures and mounted in accordance with the Entech Drawing # 360-E03001.

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The crew's quarters, galley, head, and pilothouse to be lighted with drip proof florescence lights, (one in berthing compartments, four in galley, one in head, one in pilothouse). One red incandescent light installed in pilothouse above the console.

Surface mount florescent fixture shall be mounted over mirror by wash basins.

Base outlets with duplex surge protected receptacles will be provided in stateroom, galley, and pilothouse as required by PURCHASER.

Six (6) watertight surge protected receptacles for engine room will be provided, located as directed. The sump pump receptacles will be on a separate circuit and the receptacles will be mounted above the floor plates with the plugs mounted parallel to the deck plates.

One (1) 15" 500 Watt Carlisle Finch Zeon and one (1) 19" 1000 Watt Carlisle Finch Zeon pilothouse control type searchlights, with lever controls shall be provided and mounted on pilothouse top. Searchlight switches to be located in pilothouse. The transformer and the power supply will be located in the crawl space under the pilot house as specified by the PURCHASER.

Two (2) 500 watt Hubbell "Quartzmiser" QM-500 series or approved equal shall be provided on second deck handrail forward and three (3) aft. An additional two (2) lights to be installed port and starboard side of pilot house. Operating switches shall be located at console in pilothouse.

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SECTION VII -
PIPING

701 GENERAL:

Piping system materials, installation and tests shall be in accordance with good shipbuilding practice. Piping shall be installed as directly as practical with a minimum number of bends. All pipes subject to mechanical injury shall be adequately protected. Piping shall be thoroughly cleaned after installation. Care will be taken to be sure no fuel lines are run overhead of any possible ignition source. All over board penetrations will be stainless steel schedule 80 collars. All hydraulic piping will be stainless steel, socket welded collars through all bulkheads.

702 FUEL OIL SYSTEM:

A complete diesel oil system shall be installed comprised of a filling and transfer system, and all other equipment necessary for efficient operation with remote air fuel shut downs on port side of cabin.

Filling, sound connections, overflows, and air escapes and stick gauges shall be installed in accordance with U.S.C.G. rules inside spill containments as specified by the PURCHASER. See 1407 below.

Diesel oil storage tanks shall be filled through deck filling connection, port and starboard. Piping shall be suitable for filling under pressure as well as by gravity flow. A 4" equalizing line with gate valve shall be installed as per PURCHASER requirements with 3/4" gate valve at but not directly over the fuel transfer pump.

703 EXHAUST PIPING:

Each diesel engine shall have a separate exhaust piping system between its exhaust manifold outlet and the top of the stack. Each run shall be as short and simple as possible. Flexible metal piping shall be installed between the diesel engine exhaust manifolds, the exhaust piping, and elsewhere as required for flexibility.

Exhaust lines shall be properly insulated with blanket insulation for easy removal.

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704 BILGE & BALLAST SYSTEM:

This system shall be installed in accordance with U.S.C.G. rules. The fore-peak, lazarette, engine room, storage room, and ballast tanks shall have 1 1/2" suction. These suction shall be protected by strainers of the box type. The pump shall be so arranged as to take suction from any compartment and discharge overboard or it may take its suction from a sea chest and pump to ballast tanks or from a valve arrangement it may pump from or to ballast tanks from or to deck line.

Bolted connections shall be provided to the ends of the 2" piping running through the shaft alleys.

705 FIRE SYSTEM (SHIPS SERVICE):

The fire system shall be so arranged that the fire pump shall take suction from the engine room sea chest and discharge to the fire stations. There shall be two (2) fire stations located on the main deck. At each fire station there shall be on length of 1 1/2". 4Ply underwriter's label CRL fire hoses, properly housed and equipped with a Navy all-purpose nozzles with a 1/4" orifice and a spanner wrench. A fire pump – Byrne Rice and Turner # 35764, 7 1/2 HP skid mounted unit will be installed as per drawing provided by BUILDER complete with remote switch outside engine room.

The BUILDER will furnish, install and warrant certification of a Fixed CO2 fire extinguishing system using Kidde components sized to meet USCG current regulatory requirements for the area to be protected. BUILDER will provide PURCHASER certifications and approved drawings of this system on or before delivery.

706 POTABLE WATER SERVICE SYSTEM:

The vessel shall be equipped with a complete fresh water system. A complete installation shall be in accordance with applicable U.S. Public Health Service requirements. A water filter system shall be installed in main supply line. Fiber glass grating shall be provided under the hot water heaters and the heaters will be properly secured.

707 MACHINERY CIRCULATING WATER SYSTEM:

The BUILDER shall furnish necessary materials and install a complete circulating system as required to cool each diesel engine. Expansion tanks shall be provided as required. The day tanks will be placed as close as possible to the hand railings. The pipe size, valve arrangement, etc., will be in accordance with engine manufacturer's recommendations. Main engines will incorporate Fernstrum coolers and generator engines will

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incorporate Fernstrum coolers.

708 SEA CHEST:

One (1) sea chest shall be located on the port side of the engine room. The sea chest shall be equipped with an air line from ship's service air to allow blowing out. The sea chest shall be provided with a bolted strainer plate with adequate clear areas. Valves, couplings, fittings and pipe to be schedule 80 stainless steel.

709 DRAINS:

The plumbing drains shall be so arranged that the maximum pitch possible is attained. Drain piping servicing two or more drains shall have check valves installed to prevent backup flooding.

Drains shall be installed to carry waste from sanitary fixtures to overboard discharge connections in the side of the hull and/or to a sewage treatment system six man stainless steel unit – Owens 6B or equal. A coupling below toilet “P” traps shall be installed for servicing.

The main deck shall be drained by freeing ports in the bulwarks, port and starboard as shown on plans.

710 OVERFLOW, AIR ESCAPES, PLUMBING VENTS, SOUNDING TUBES: The

height of air escaped overflows shall be as required by U.S.C.G. regulations. Overflows shall be installed for all compartments or tanks to which liquid is supplied under pressure, such as fresh water tanks, fuel oil tanks, and ballast tanks. The overflow shall be combined with the air escapes and shall overflow under the bulwark rail or along side house. Vents are stainless steel. The dryer vent will be free of obstruction.

711 PLUMBING FIXTURES:

Plumbing fixtures to be as shown on plans, of Crane or equal make standard toilets. All faucets to be standard and trim to be heavy duty chrome plated. Heavy duty medicine cabinets, plate glass mirrors, soap dish, toilet paper holders, plastic shower curtains, etc., necessary to complete bathroom to be furnished and installed.

712 SEWAGE TREATMENT:

The BUILDER shall furnish and install a sewage treatment plant to comply with U.S.C.G. and E.P.A. regulations for discharge of treated "black water" overboard.

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The system, including all venting pipe and fittings shall be a Stainless Steel Owens Model 6B unit or approved equal.

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713 LUBE OIL:

A built-in clean lube oil tank shall be provided as shown on contract plans. Tank shall be equipped with a deck fill, vent inside a spill railing as per U.S.C.G. regulations, and sight glass. The capacity shall be approximately 200 gallons.

714 DIRTY OIL:

A built in dirty oil tank shall be provided as shown on contract plans. Tank shall be equipped with a deck discharge, vent inside a spill railing as per U.S.C.G. regulations, and sight glass. Waste oil/water overboard discharge will be hard piped to the main deck. All diesel engine sumps shall piped with appropriate valves as specified in the plans to a Wilden Air Diaphragm pump for changing oil. A valve shall be provided on discharge line.

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SECTION VIII - VENTILATION

801 ENGINE ROOM VENTILATION:

There will be furnished and installed at aft end of deck house two (2) supply fans each rated at approximately 6000 C.F.M. @ 1 1/2" SP – Axel; MODEL # TA240503DD. Each fan will be ducted into the engine room space. Intake blowers shall be extended as per PURCHASER requirements. Additionally, an Axel; model # DDF-18 exhaust blower assembly will be provided and installed on the exhaust stack as specified.

802 EXHAUST FAN:

An exhaust fan of about 100 C.F.M. will be provided for the galley in the hood over the galley range. All bathrooms will have exhaust fans installed in them.

803 AIR CONDITIONING & HEATING:

A central type air conditioning system, Carrier type with heat strips shall be furnished and installed habitable area of main deckhouse. Electric duct heaters shall be supplied for winter comfort. House shall be "zoned" to incorporate two – 4 ton air cooled units. The ducting to the unit provided to cool the quarters on the second deck will be run to include the pilot house except it will have flutes that can be opened or closed manually in case the ductless unit fails.

The BUILDER will also furnish and install a Carrier 3 fan coil unit for the pilot house.

The thermostat for quarters shall be located in the hallway on the second deck.

Front and rear windows will have defrosters.

A walkway over the air conditioning units behind the pilothouse shall be provided. It will have fiberglass grating and be secured with stainless steel fasteners.

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SECTION IX NAVIGATION AND ELECTRONICS

901 MAGNETIC COMPASS:

One (1) 5" illuminating compass; Ritchie model HB 845; or equal.

902 AIR WHISTLE:

A Kahlenberg Duplex or equal air whistle shall be furnished and installed, complete with light. The air line will have a valve in line located near the base as directed by the BUILDER.

903 SHIP'S BELL:

One (1) bell to meet U.S.C.G. rules ; Perko model # 179- minimum 12" diameter shall be furnished and installed.

904 CLOCKS:

One (1) 6" dial, chrome finished case, eight-day clock shall be provided in pilothouse.

905 NAVIGATION LIGHTS:

The navigation lights shall be installed in conformance with Inland River rules. All lights shall be watertight. All lights to be Perko U.S.C.G. approved fixtures; 110 volt. A hinged mast with shields for lights shall be provided. The mast pole navigation lights will be mounted where the lower mast lights are clearly above the radar scanner and the distance between the top of the lower navigation lights and the bottom of the upper navigation lights is no less than one meter apart.

906 RADIOS AND RADARS:

- 1 GX-6000 VHF Radio
- 3 Commander 8-6 Antennas
- 2 GX-2000 VHF Radio
- 1 Gallery Speaker w/Vol Control
- 1 Furuno FAR-2127 BB W/6.5' Antenna
- 1 GS19L 19" LCD Monitor
- 1 FCV-628 Sounder
- 1 SC-70 SAT Compass

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- 1 EA-170 AIS
- 1 Commander 4-6 AIS
- 1 VLH-3000A Hailer (Modified)
- 1 515 SBG-18X Goose Neck Mic (Modified)
- 1 SPC-40RP 40W Horn
- 1 LH-3010 Intercom Speaker
- 1 Davis 6152C Weather Station
- 1 WH 1000 TV Antenna w/Amp
- 4 Master Volt AGM DM29 12V 700AH Batt.
- 2 PT25W Newmar Chargers
- 1 Swing Meter Sigma 300
- 3 Sets of Sounder Plugs
- 1 808-9001 Remote Panel
- 1 BR-500 Bridge Watch
- 3 BR-540 Cabin Panels (Capt. Rm., Galley)

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SECTION X - ALARMS

1001 GENERAL ALARM:

A general alarm system will be installed with bells and visual bell strobe light in the engine room. The galley and second deck passage way will have horns only.

1002 ENGINE ROOM AND FIRE ALARM SYSTEMS:

The BUILDER will provide and install the engine alarm system and the fire alarm system. The BUILDER will provide the PURCHASER certified copies of the systems plans along with appropriate approval letters and/or certificates of authenticity required by any regulatory authority.

The engine alarm systems will be a PLC based 32 point system. System includes hour meters for main engines and generators, and an alarm log that records each event along with the time and date of the event (up to the last 100 events). A color touch screen display/interface in the galley hallway and a monochrome touch screen display/interface in the wheelhouse, and a 12/24 vdc power supply with battery back up for the systems power. Square D “GDW” style pressure sensors for all pressure monitoring. Using proximity sensors mounted on the main engines to display main engine RPM on the displays. These also serve as an “arming” point for the system to know when to monitor main engine points. Using “idle” and “run” low oil pressure points as a way to monitor oil pressures according to the engines RPM output. The generators are armed by a “run detection” relay that ties in directly to the generator voltage output. They are also used to indicate that the generator is on or off on the display. Installed is an “acknowledge” button in the lower engine room to silence

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alarms. The points covered on these systems are as follows:

Port/Stbd Main Engines
Low Oil Pressure Idle Low
Oil Pressure Run High
Water Temp
Low Day Tank Water Level

Port/Stbd Reduction Gears
Low Oil Pressure
High Oil Temp
Low Oil Level

Port/Stbd Generators
Low Oil Pressure High
Water Temp
Low Day Tank Water Level
Port/Stbd Generator on/off

Auxiliary Points
Fwd Hydraulic Tank Level Aft
Hydraulic Tank Level Port
High Fuel Tank Level Stbd
High Fuel Tank Level High
Bilge Level
Low D.C. Power
Main Air Pressure

Note: All connections must be watertight and caulked.

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SECTION XI - REQUIREMENTS FOR LIVING & MESSING

1101 GENERAL:

It is the intent of these specifications to provide living and messing facilities for the crew, constructed as simply and durable as is consistent with utility and good commercial marine practice.

All exposed bulkheads and ceilings shall be insulated with 4" fiberglass insulating bats.

The furred-out walls and overhead in galley, halls, berthing areas and pilothouse shall be covered with Ornyte "Duratuff" panels attached by stainless steel screws with trim finish. Exposed steel walls shall be sandblasted, primed, and coated with two coats of a color coat as selected by PURCHASER.

Ornyte colors to be selected by PURCHASER. All decks within the living area shall sandblasted, primed with 1.5 mil coat of primer and covered with epoxy "poured" flooring system in all flooring areas.

The hallway wall to the exercise, stern wall and outside exercise room will have a cellulose based fiber wall board (Homosoate Sound Proofing) laid prior to the epoxy "poured: flooring system on the flooring areas.

All equipment and furnishings shall be located approximately as shown on plans.

1102 GALLEY:

Galley dresser and cabinets shall be constructed of plywood with exposed top to be Silestone composite granite. The layout of the base and the wall cabinets will be in compliance with the PURCHASER'S specifications. The base cabinets shall be 36" above floor; the upper cabinets shall have shelves with dish and glass racks. The sink will be of commercial grade dual deep sink design and shall be built into the counter top. All locker doors shall have chrome plated brass hardware. The refrigerator and the freezer will be mounted on a stand so the floor under these appliances can be inspected and cleaned without having to move the appliances. These appliances will also be secured to the bulkhead to prevent tipping over in the event of a sudden list or surge. The refrigerator freezer section will have an ice maker and the ice maker will be supplied with a line and shut off valve from the potable water tank with access in the closet under the stairwell.

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The following shall be provided and installed in galley or as directed by the PURCHASER by the BUILDER:

1. One (1) electric range, General Electric, four burners with oven.
2. One (1) "reach-in" refrigerator-freezer, Maytag, of approximately 25 cu. ft. total capacity w/ icemaker.
3. One (1) "reach-in" freezer, General Electric, approx. 22 cu. ft. capacity.
4. One (1) table approximately 3'x6 1/2' with Silestone composite granite top.
5. Galley range hood of stainless steel with fire extinguisher.
6. Two (2) towel bars and towel rack.
7. One reach-in pantry.
8. Shelving to be provided in storage area under stairwell and in lower head closet.
9. Six OF chairs will be stained to match the cabinet finish complete with vinyl covered cushions to match the settee cushions in the pilot house.
10. One tank-less electric type in line water heater under the galley sink with GFI plug disconnect.
11. One 1/2 HP trash compactor.
12. Washer and dryer.

1103 STATEROOM AND HEADS:

Stateroom shall be fitted as shown on plans. Windows will have black out wood blinds for crew comfort. Life preserver racks will be provided and mounted in the overhead of each bunk room to match the life preserver rack provided in the pilot house.

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Dimensions of closets in bunk rooms will be enlarged as per owner prints. The Vanity will have granite composite top.

The mattresses will be ordered to fit the beds. The size will be 36"x84" and be "Pillow Top" Admiral quality from Capital Bedding Company or comparable. The BUILDER will furnish and fit heavy-duty ladders for safe access to the top bunks where applicable.

1104 PILOTHOUSE:

Pilothouse shall be fitted as follows:

1. One (1) Deluxe High Back Inland Chair BUILDER furnished.
2. One (1) built-in upholstered settee.
3. The BUILDER will provide two pods designed to house all instruments, throttle clutch controls, alarms, gauges, and switches. The pods will be mounted on the top of each side of the console as directed by the PURCHASER. The steering and flanking levers will be mounted as directed in the BUILDER furnished console between the two pods.
4. Life preserver wood rack overhead.
5. One wood built chart table mounted on top of BUILDER furnished file cabinet
6. One mini fridge.

1105 GENERAL:

A plywood filter cabinet shall be provided and installed in the Engine Room as per PURCHASER'S specifications.

Shelves shall be provided in both lower and upper bathrooms as directed. A door

shall be provided and installed from galley to second deck with A/C vent. Mascote BUILDER furnished will be installed on three (3) walls in main deck bunk room, (eight (8) sheets.)

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SECTION XII - LIFE SAVING AND SAFETY EQUIPMENT

1201 GENERAL:

The BUILDER shall install all life saving and safety equipment necessary to meet the latest requirements of the U.S.C.G.

1202 LIFE PRESERVERS:

Approved life preservers shall be furnished for 100% of the complement on board the craft, plus two (2) for P/H watch.

1203 RING BUOYS:

Four (4) ring buoys of 30" diameter shall be furnished. Each buoy shall have a 15 fathom line. Two ring buoys shall be installed in a suitable location outside the pilothouse door and equipped with water lights. The vessel name to be stenciled on each one. The other two will be mounted as close to the fire axes as practical.

1204 U.S.C.G. APPROVED PORTABLE FIRE EXTINGUISHERS:

U.S.C.G. approved fire extinguishers shall be installed – with tags dated the same month as delivery to meet USCG regulations in the following locations at minimum:

- 2 – 15 lb. CO2 extinguishers in the engine room
- 1 – 10 lb. Dry chemical extinguisher in the galley
- 1 – 10 lb. Dry chemical extinguisher in the pilot house
- 1 – 10 lb. Dry chemical extinguisher mounted on or near the paint locker.
- 1 – 10 lb. Dry chemical extinguisher mounted in the hall way on the second deck.
- 1 – 15 lb. CO2 extinguisher in the galley mounted by or near the stair well.

1205 FIRE AXES:

There shall be properly mounted two (2) fire axes in the following locations. Both will be mounted on the main deck. One will be forward and one will be aft.

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1206 FIXED CO2 FIRE EXTINGUISHING SYSTEM:

The BUILDER will furnish and install and warrant certification of a Fixed CO2 fire extinguishing system using Chemtron components sized to meet USCG current and/or pending regulatory requirements for the area to be protected. BUILDER will provide PURCHASER certifications and approved drawings of this system on or before delivery. BUILDER will add a second fire pump station on starboard bulkhead.

1207 SMOKE DETECTORS:

The BUILDER will furnish and install smoke detectors in the bunkrooms, the laundry room, the pilot house, the galley and the exercise room.

1208 DAVIT AND DAVIT EXTENSION:

The BUILDER will add an 18” extension in the davit. The davit will be furnished and installed on an 18”x18”x1/2” doubler with rounded corners. The davit maximum lifting capacity will be stenciled on it.

1209 HINGED MAST POLE:

The base of the mast pole on top of the pilot house will be provided in accordance with Entech drawing # 360 S14 – 01 – revision 4. The forward navigation lights mounted on the mast pole will be placed in USCG specs.

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**SECTION XIII - PAINTING, PROTECTION,
MARKING, COATING SPECIFICATION**

1301 PAINTING AND COATING:

NOTE: All Steel must be cleaned to an SSPC SP-1 0 “Near White” condition and apply one full coat of either Carbozinc 8703 or Carboweld 17FG depending on VOC requirements for that shipyard @ 2.0 to 3.0 mils wet to obtain .75 to 1.5 mils D.F.T.

- 1) All Exterior and Interior Surface Area’s. (Potable Water Tank Not Included)

Secondary Surface Preparation

- 1) *Option one:* Abrasive Spot Blast all welds and other damaged Pre- Construction Primer areas to a SSPC SP-6 Commercial Condition to Profile/Roughen welds and remove all welding slag, BB’s, dirt, and other surface contamination.
- 2) *Option two:* Power Tool Clean to SSPC SP-3 condition so to Profile/Roughen all welds and other damaged Pre-Construction Primed areas. Remove all welding slag, BB’S, dirt and other surface contamination.
- 3) Blow surface down using clean compressed air.

NOTE 2: Apply one spot coat to all Blasted or Power Tool Cleaned areas using Carboguard 235 or 893SG Gray C703 at 5.0 to 6.0 D.F.T.

- 2) SSPC SP 1 Solvent Clean or Water Wash using Fresh Water at a minimum of 3,500psi., to remove all Surface Containments from the Pre-Construction Primers. A degreaser like Surface Cleaner #3 may be needed if surfaces are oily.
- 3) Surfaces to be painted must be dry of Solvents and Water before applying any coating.

2a. Hull Keel to Waterline

2b. Surface Preparation

Clean Per Secondary Surface Preparation in Section 1a.

2c. Coating System

Coat 1

Apply one full coat using Carboguard 235 Gray or Buff @ 10.0 to 12.0 mil wet to obtain 7.0 to 8.0 mils D.F.

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Stripe Coat

Apply one stripe coat to all welds and edges using Carboguard 235 Black

Coat 2

Apply one full coat using Carboguard 235 Black @ 8.0 to 9.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

NOTE: While Coat 2 is tacky, apply the Coat 3 to all surface areas.

Coat 3

Apply one full coat using C-Flex123 AF Red @ 9.0 to 8.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

2a. Waterline to Deck

2b. Surface Preparation

Clean per Secondary Surface Preparation in Section 1a.

2c. Coating System

Coat 1

Apply one full coat using Carboguard 235 Gray or Buff @ 8.0 to 9.0 mil wet to obtain 5.0 to 6.0 mils D.F.T.

Stripe Coat

Apply one stripe coat using Carboguard 235 Black to all welds, sharp corners, angle edges, rat holes, and irregular areas.

Coat 2

Apply one full coat using Carboguard 235 Black @ 8.0 to 9.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

Coat 3

Apply one full coat using Carbothane 134 HG Black @ 3.0 to 4.0 mils wet to obtain 2.0 to 3.0 mils D.F.T.

3a. Exterior Decks

3b. Surface Preparation

Clean per Secondary Surface Preparation in Section 1a

3c. Coating System

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Coat 1

Apply one full coat using Carboguard 893SG Gray or Buff @ 9.0 to 10.0

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mils wet to obtain 5.0 to 6.0 mils D.F.T.

Stripe Coat

Apply one stripe coat using Carboguard 893SG Oxide Red to all welds, sharp corners, angles edges, rat holes, and irregular areas using.

Coat 2

Apply one full coat using Carboguard 893SG Oxide Red @ 9.0 to 10.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

NOTE: While Coat 2 is wet, hand apply Non-Skid 47 to all surface area.

Coat 3

Apply one full coat by rollers using Carbothane 134HG Marine Chartering Red @ 3.0 to 4.0 mils wet to obtain 2.0 to 3.0 mils D.F.T.

4a. Superstructure, Both Interior and Exterior Including all Weather Exposed Areas Except Decks.

4b. Surface Preparation

Clean Per Secondary Surface Preparation in Section 1a.

4c. Coating System

Coat 1 (All Superstructure Interior or Exterior Areas) Primer Coat

Apply one full coat using Carboguard 235 Gray or Buff @ 9.0 to 10.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

NOTE: After completion of work, surface shall be cleaned and washed free of dirt, slag, b b 's., and o t h e r s u r f a c e c o n t a m i n a t i o n . F o l l o w i n g w a s h i n g , t h e e n t i r e s u r f a c e m u s t b e a i r b l o w n d o w n u s i n g c l e a n c o m p r e s s e d a i r t o c o m p l e t e l y d r y p r i o r t o a p p l y i n g t h e n e x t c o a t .

Stripe Coat

(Interior & Exterior of Superstructure) (Exposed) or (Non-Exposed) Apply one Stripe or Spot coat using Carboguard 235 gray or buff to all damaged areas, under all angles, in and around rat holes, bolts and nuts, man-way hatches or any other hard to spray area.

NOTE: Non-Exposed Areas, the above Full and Spot Coats shall be the final coat under insulation.

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(Exposed Bulkheads, Shower Area of Interior House)
Apply one full coat using Carboguard 235 White @ 8.0 to 9.0 mils wet to obtain 5.0 to 6.0 D.F.T.

Final Coat (Interior of House Stair)
Apply one full coat using Carboguard 235 Gray @ 8.0 to 9.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

Final Coat (Interior Exposed Areas Including, Engine Room & Machinery Spaces and Forward Compartment)
Apply one full coat using Carbothane 134HG White @ 3.0 to 4.0 mils wet to obtain 2.0 to 3.0D.F.T

Coat 2 (Exterior of Superstructure)
Apply one full coat using Carboguard 893SG Gray @ 9.0 to 10.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

Final Coat (Exterior Superstructure)
Apply one full coat using Carbothane 134HG White @ 3.0 to 4.0 mils wet to obtain 2.0 to 3.0D.F.T

Trim in Work (Exterior)

Trim out all exterior surfaces using Carbothane 134HG Green, Black, Beige, and Yellow at 3.0 to 4.0 mils wet to obtain 2.0 to 3.0 mil D.F.T.

5a. Engines & Gears

Builder to supply Cummins White Only.

6a. Ballast, Void Tanks

6b. Surface Preparation
Clean Per Secondary Surface Preparation in Section 1a.

6c. Coating System

Coat 1

Apply one full coat using Carboguard 235 or 635 Buff @ 8.0 to 9.0 mils wet to obtain 5.0 to 6.0 mils D.F.T.

NOTE: After completion of work, surface shall be cleaned and washed free

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of dirt, slag, bubbles, and other surface contamination. Following washing, the entire surface must be air blown using clean

1302 MARKING:

All lettering and stenciling will meet or exceed U.S.C.G regulatory requirements relative to size and spacing.

The vessel's name is to be painted on the forward, port and starboard sides and across transom with raised welded plate letters.

This vessel's name boards will be made of rubber coated aluminum plates with reflective lettering. The name boards will be secured to the hand railings around the pilot house port and starboard side.

The hailing port shall be painted on transom and outlined with a raised plate and seal welded.

Draft marks shall be painted in Arabic numerals on port and starboard, fore and aft, sides of hull on raised welded plate numbers.

The Official Number weld beaded in the engine room bulkhead and stenciled.

The top of the bull rail, the tops of the push knees and the edges of exterior steps will be trimmed in yellow.

1303 ANODES:

Approximately forty (40) 22# zinc anodes shall be installed on hull as directed by Corrosion Engineering Company's representative. A teardrop anode will be installed in the sea chest.

SECTION XIV DECK MACHINERY

1401 DECK WINCHES:

BUILDER shall install on 1/2 doublers two winches complete with towing wires. The winches shall be NABRICO hydraulic-electric Model 40-7HE or equivalent

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with electrical and hydraulic in storage hold. The winches shall include winch frames and winch covers. The winches will also come with level winds. The winch frames will be constructed from 2"x2"x1/4" angle with dimensions as follows: 45"x34"x44". The top will be covered with 3/4" thick marine plywood. The collars penetration the deck will be stainless steel sch. 80 pipe.

1402 BARGE LIGHTS:

The BUILDER will furnish and install barge light hook-up and depth finder hook-up to the starboard push knee.

1403 CABLE HANGERS:

BUILDER shall provide four (4) cable hangers on push knees.

1404 GAUGE TUBES:

BUILDER shall install gauge tubes for slop oil tanks on stern deck.

1405 PAINT LOCKER:

BUILDER shall provide and install aluminum paint locker complete with one portable 10# ABC fire extinguisher mounted on or adjacent to the paint locker.

1406 SKIFF:

A bridle for builder furnished skiff shall be installed along with electric davit with a water tight push button remote switch.

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1407 STICK GAUGE:

Air actuated fuel shut off valves mounted in a fiber glass enclosure and fuel tank stick gauges mounted in a bolted flange – complete with stainless steel bolts and Teflon coated nuts - raised off the main deck just enough to clear the water tight galley doors (about six (6) inches off the main deck to the center of the flange).

1408 LEAD LINED SOUND PROOFING:

The BUILDER will furnish and Install lead lined sound proofing as discussed in aft bulkhead lower main deck quarter and in engine room overhead lower engine room from engine access cut out to fuel tank bulkhead.

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