The Restoration of CANGARDA

The Last United States Constructed Steam Powered Yacht of the Edwardian Period[1]

By Robert G. McNeil and Jeff Rutherford

Introduction & Synopsis

CANGARDA is a one hundred twenty six foot, one hundred ton yacht originally built in 1901 by Pusey and Jones of Wilmington, Delaware, (in the amazing time of five months or less) for Charles Canfield. After a short ownership terminated by his wife, CANGARDA was sold to George Fulford of Brockfield, Ontario. The Fulfords renamed the boat MAGEDOMA. Even though George Fulford was killed in an automobile accident in 1905 (the first Canadian to die by such a means) the family cruised MAGEDOMA for twenty years in the Thousand Island area of Lake Ontario. She was a well known and majestic yacht in these waters.

1. All Figures are Courtesy of the Authors and Tri-Coastal Marine

George Fulford was a Senator in Canada. His principal business was the sale of "pink pills for pale people" an iron-containing concoction that his company peddled in towns throughout Canada. One of the interesting advertising mechanisms used was to have young ladies dressed in pink dresses roller skate down the streets of the towns with placards on their fronts and backs advertising the pills. Senator Fulford had built a large house in the Thousand Island district in a town known as Brockville. His home exists today as the Fulford Museum.

He often entertained aboard his yacht. Photographs of King Edward and the Prime Minister of Canada aboard are in the archives of the Fulford Museum. Other pictures show guests lounging on the decks as the vessel plies the waters of this very picturesque area of the St Lawrence. At the time of World War II the Fulfords donated the vessel to the Canadian Navy.

In 1951 MAGEDOMA was sold to Cameron Peck, who used the vessel until 1954 when she was sold to Frederick Smith. It was Smith who restored the original name of the vessel, CANGARDA. In 1983 CANGARDA was sold to Richard Reedley, who began a major restoration of the vessel. She was disassembled, the engines sent to England for restoration, and the wood paneling including all the parts put in storage.

Unfortunately, after making repairs to the hull, Mr. Reedley was unable to complete the restoration. The vessel was placed back in the water and left for some ten years after which time she sank. A rescue was undertaken by Elizabeth Meyer of J Class Management.

The current restoration of CANGARDA has been undertaken with a keen eye on maintaining as many details of the original yacht as possible. The original Pusey and Jones plans have been obtained from museum archives. Hundreds of photographs showing the original structure and details of the yacht have been scanned and filed. All efforts are being taken to save every part and every bit of wood possible.

At the same time, she is a steam powered vessel greater than sixty tons and is therefore subject to U.S. Coast Guard regulation and inspection. CANGARDA will be used actively under the new owner. The intent is to cruise the vessel in Alaska and then the East Coast of the United States before taking her to Europe for some cruising in the Mediterranean. The consequence of this level of activity is that the new boiler has been equipped with oil-fired burners, and the hull has been rebuilt to ABS standards. As the rest of the materials of the vessel were preserved in an earlier effort for restoration and as plans and photographs of the original vessel are plentiful, the restoration is being effected with great accuracy and authenticity.

Background to the Restoration of a Great Yacht

CANGARDA finds a sucker

Sometimes it is not that people find boats but rather that the boat finds an owner. Most of this is not particularly rational. All the above applies here. Originally shown as a proposed project

in the summer of 2002, it was not until the Herreshoff Rendezvous of that year that the "bug" bit. For some reason the idea of restoring CANGARDA really sunk in.

She was owned by Elizabeth Meyer of J Class Management. Because of her rescue of the sunken vessel, the hull was "on the hard" in Fairhaven, Mass., with the engines and woodwork in storage in buildings at Kelley's Boat Yard. While poring over the stored woodwork and restored steam engines the idea of restoring the last of the American built Edwardian era steam yachts became a reality. After some negotiations with Elizabeth Meyer a deal was struck.

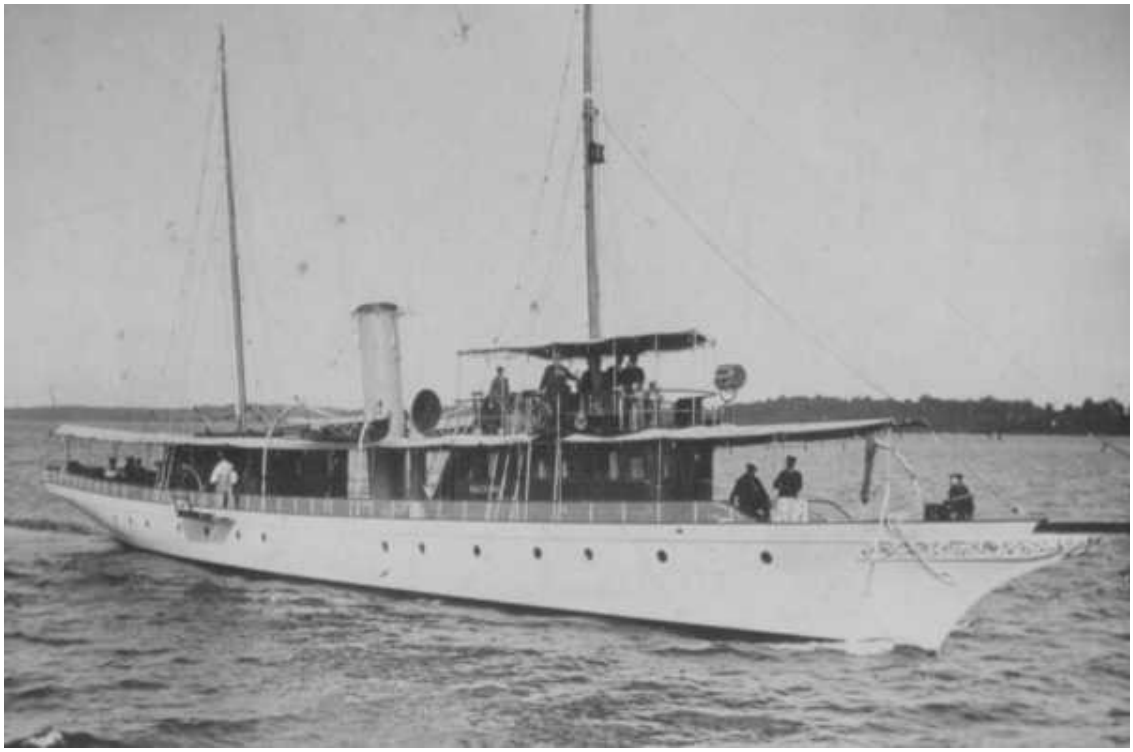


Figure 1: CANGARDA In Her Heyday

The Great Lines of a Classic Yacht

[Please refer to the Appendix for CANGARDA statistics, outboard and inboard profiles and deck arrangements] CANGARDA was a classic "Edwardian Yacht" of her era. At 126 feet long on a seventeen foot beam and with a seven foot draft, she was an easily driven hull. She has two deck houses made of Cuban mahogany. The forward house was the dining salon. The after house was the smoking lounge. It was from the after deck house that the stair case descended into the guest staterooms. Two Cuban mahogany skylights allowed natural light into the cabins below. All of these parts survived, as well as the forecastle, bulkheads, furniture, fixtures and hand railings.

Below decks aft there were four staterooms and three "heads". Forward of the engine room was the galley and crew's quarters. Little remains of fixtures from the forward part of the vessel.

Figure 2: Dining Salon in the After Deck House

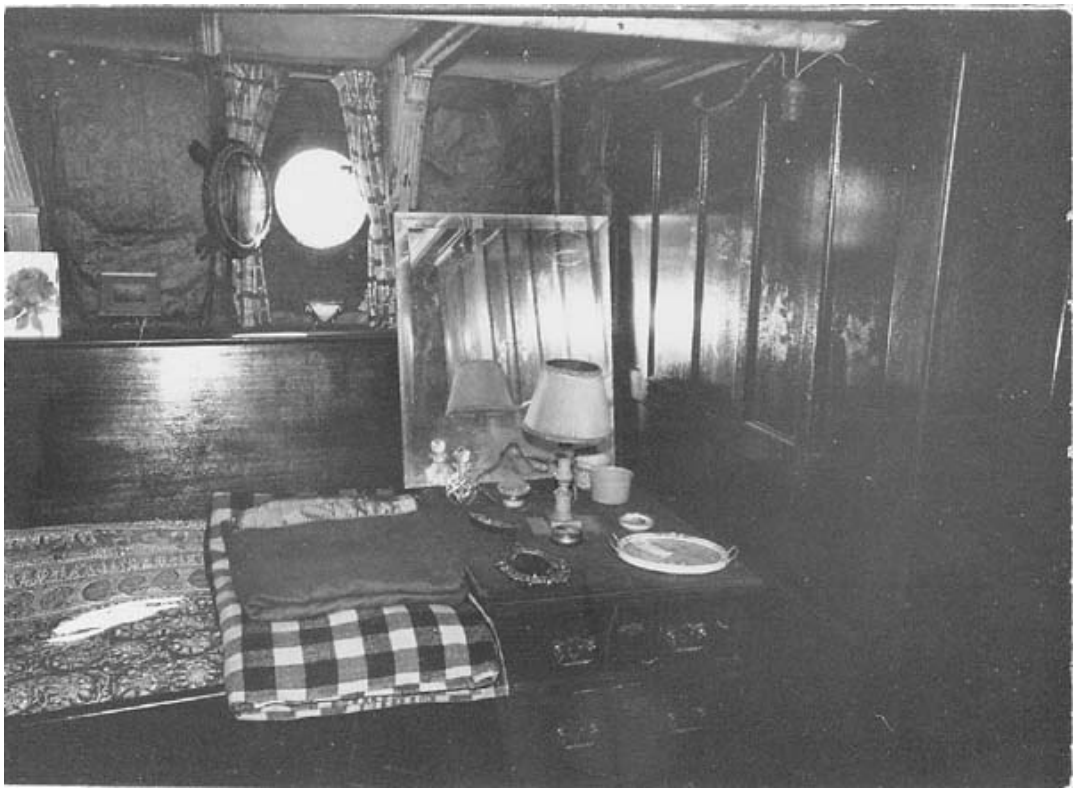


Figure 3: Owner's Stateroom

The engine room attracts the most attention of this vessel. There are seven steam engines required to operate CANGARDA. The main engine is a Sullivan triple expansion steam engine. Two feed pumps provide water to the boiler (one backup for the other), a steam driven circulating pump drives sea water through the condenser to condense the steam back to water, and an engine to pump water out of the condenser and into the "hot well" (air pump) where the water is cleansed (removal of oil which comes into the system as part of the lubricating process) prior to being put back into the boiler. The sixth engine is a bilge pump and the last a steam powered windlass.

Preservation by Richard Reedley

In the 1980s the restoration of CANGARDA was initiated by Richard Reedley, the then-owner of the vessel. After almost eighty years of service the CANGARDA needed a major overhaul. Plating in the hull was thin in many places, the decks overly worked, and the engine room a menagerie of pipes and cables - making something happen, but what a miracle!

Richard took the vessel apart piece by piece. The woodwork was preserved in storage. Each bulkhead and skylight, as well as many pieces of railing, were carefully removed for storage. The en-

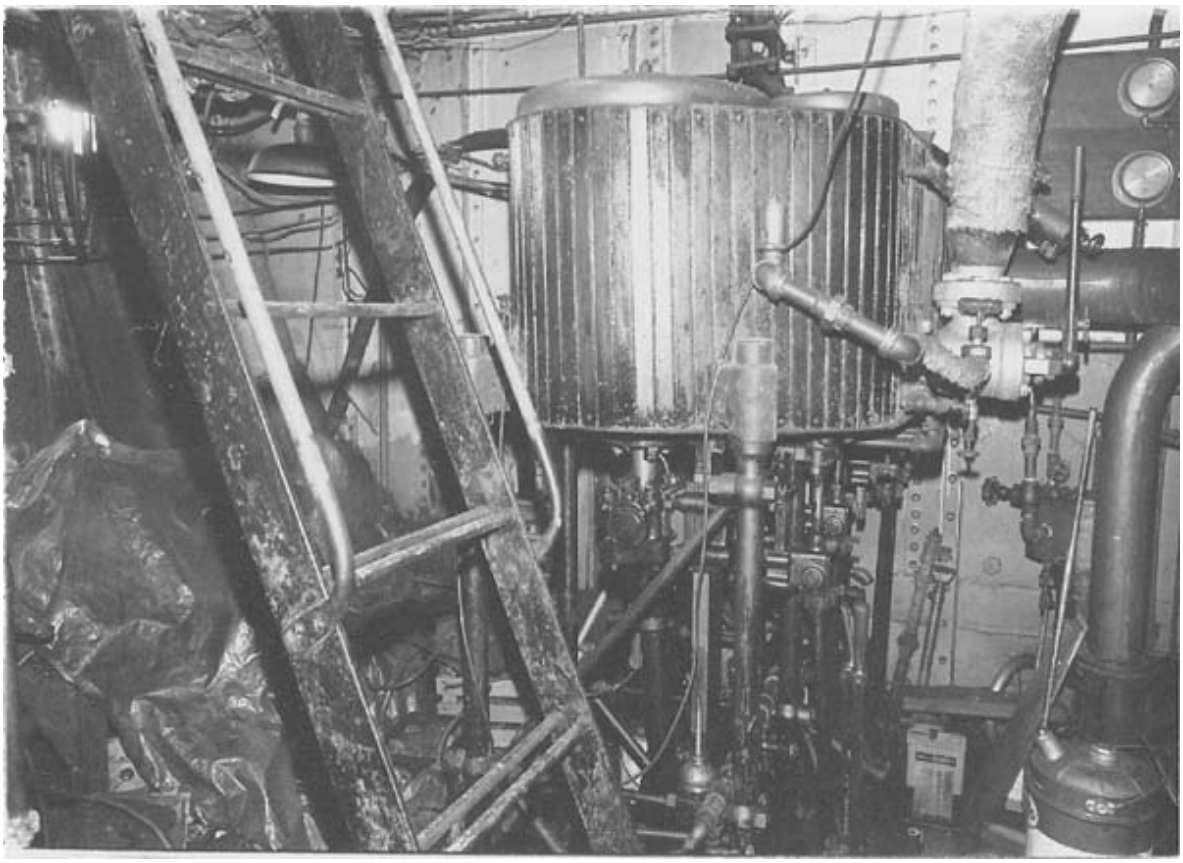


Figure 4: Triple Expansion Main Steam Engine and Access Ladder

Figure 5: The Once Proud Bow of CANGARDA (right) Resides On the Hard in Farihaven

gines were then pulled out of the vessel and the main engine sent to England for restoration. All the fittings for stanchions, railings and the boarding ladder were put into bins for the restoration. All the portholes were removed.

The hull was re-plated from the first strake down to the keel. Before the work could proceed further the owner became ill and the hull was put into Boston harbor and left to rust through. She sank in 1999. Elizabeth Meyer of J class Management, the well known restorer of ENDEAVOR, rescued the hull and she was put "on the hard" in Fairhaven.

Figure 6: CANGARDA Hull Restoration in the 1980s

Figure 7: CANGARDA Resting on the Bottom in Boston Harbor

The Strategy of the Restoration

The current owner is restoring CANGARDA utilizing two sources of information. The first are the existing Pusey & Jones plans that have been preserved at the Hagley Museum in Wilmington, Delaware. These records are very fragmentary, containing many small scale plans (Figure 8). The scanned Pusey & Jones drawings form the basis for new drawings prepared by Tri-Coastal Marine that satisfy Coast Guard and ABS requirements (Figures 9 & 12). The second source is the plethora of photographs both from the Fullford Museum in Brockville Canada and from pictures taken and provided by Richard Reedley and others.

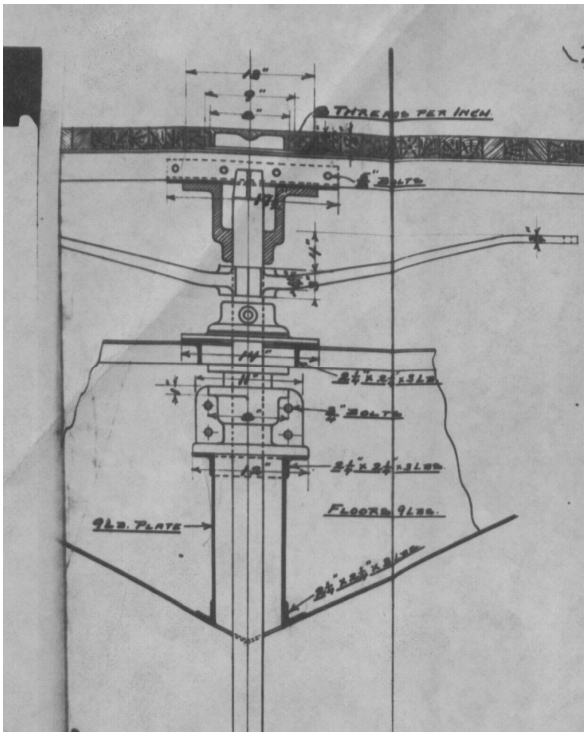


Figure 8: Scan of Pusey & Jones Drawing Showing the Rudder Quadrant, Rudder Tube and Riveted Support Structure. This is Typical of the Detail Plans Available for the Restoration

The vessel will be actively used for cruising over the foreseeable future and will be made available to museums as appropriate and desired. Planned cruises include a return to the Fulford Museum, South East Alaska, a season in Belize, at least one season in the

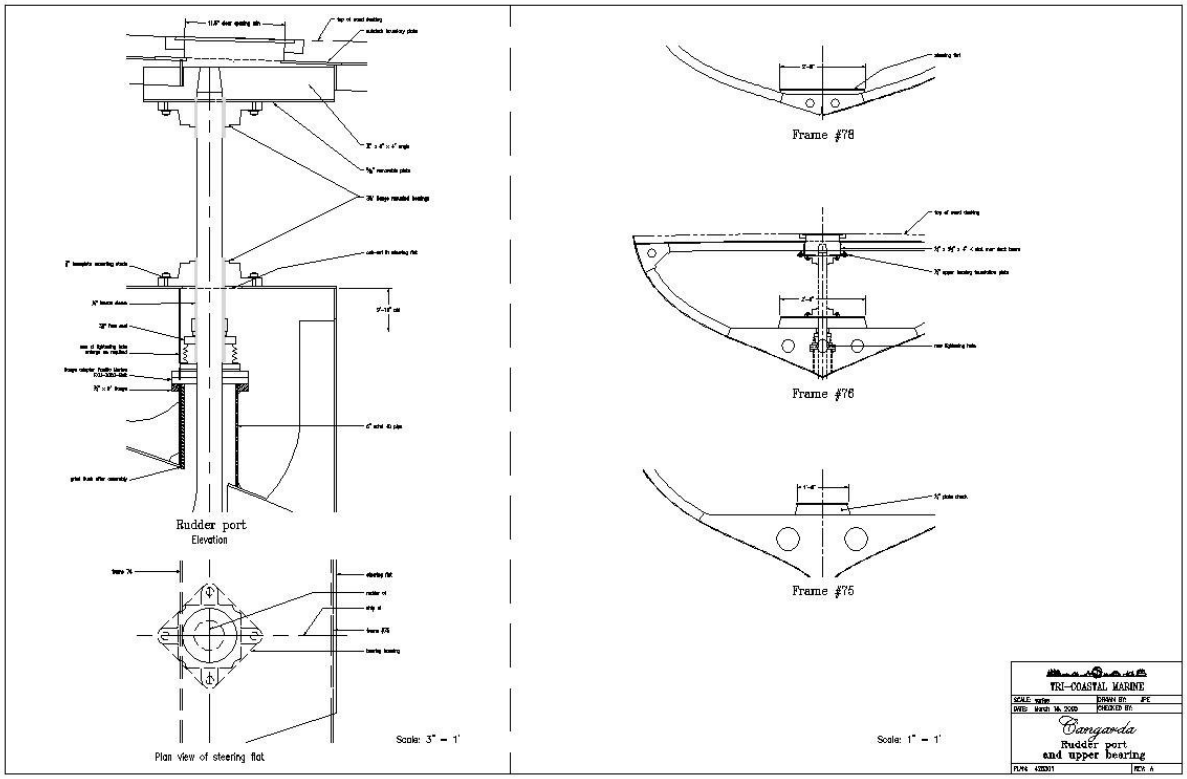


Figure 9: New Tri-Coastal Marine Drawing of the Rudder Quadrant, Rudder Tube and Welded Support Structure

Mediterranean, which will include serving as a tender for the Herreshoff P-Boat JOYANT during the classic series in Cannes and St. Tropez, and a voyage to Elsmere Island in the Canadian Arctic.

The restoration takes into account that CANGARDA will be in the open sea and subject to all the elements that implies. She will have full modern navigational and communication aids (all of which will be concealed when she is dockside) and she is required to pass the safety examinations of the U.S. Coast Guard as referred to earlier.

However, if Charles Canfield or George Fulford walked on the decks they would not see many changes to the vessel they enjoyed so much.

Significant effort has been undertaken to keep the restored CANGARDA original by using every part from the original vessel found in storage. At the same time the vessel is intended to be operable in the open sea. CANGARDA is a steam powered yacht in excess of 60 tons and such is regulated by the U.S. Coast Guard. To make the vessel safely operable a new boiler is being constructed. While many of the original valves and sight gages will be used the boiler will be oil fired (as compared to coal in the original vessel) and the operation will be automated so that no human is required to be constantly in the engine room during operations.

Other than this the design and outfitting of the engine room will be as close to the original as possible. The original electric panel has been installed. The

Figure 10: Saving What Metal that was at all Feasible to Use

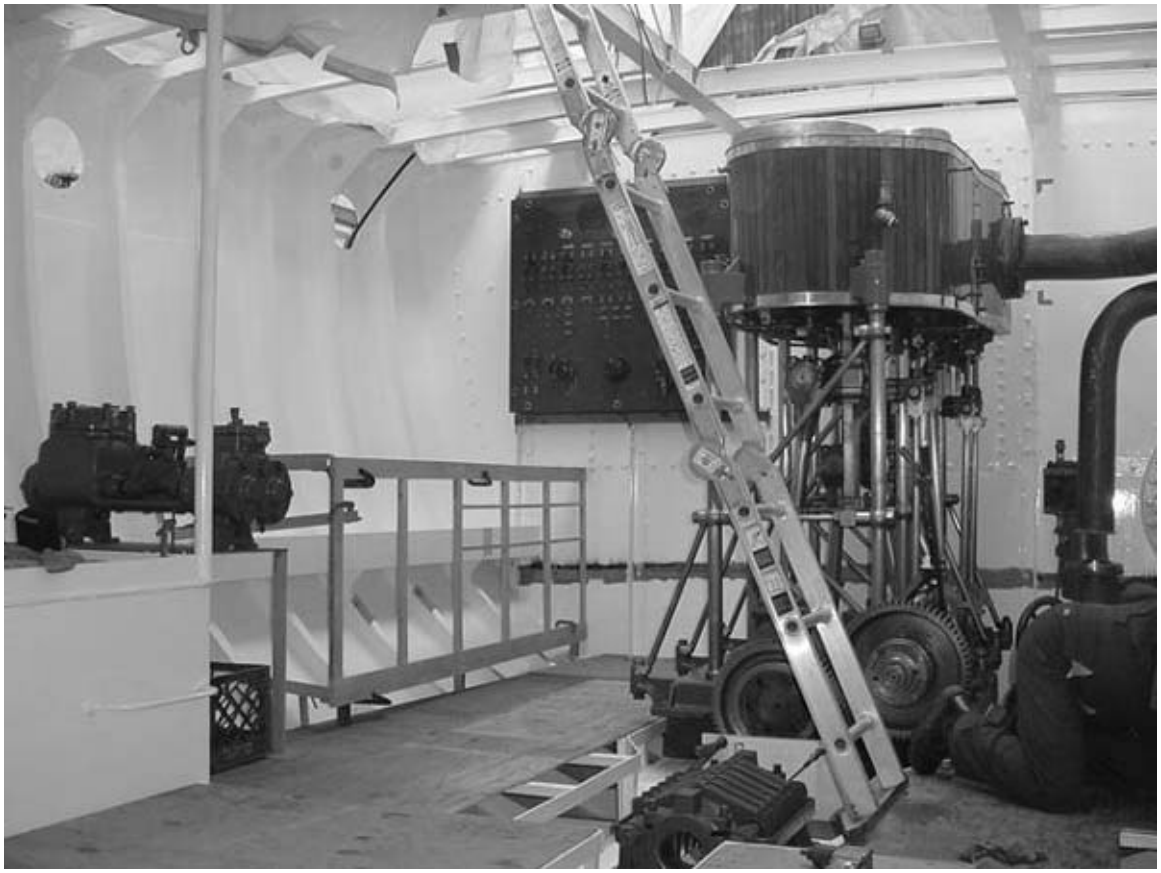


Figure 11: Restored Main Engine and Condenser with Electric Panel in the Background. Compare with Original Figure 4.

electrical gages are operational. The original steam pressure sensors have been refurbished and installed. The original telegraph bell is being installed. The original steam engines working together in unison to power CANGARDA will be a sight to behold for us, the generation of diesel engines.

The cabins below will be largely constructed in the original configuration. Sinks in the cabins as well as the water valves are original. The anchor windlass and anchor are all original. Lock sets, hinges, pin rails, hand rail parts, bulwarks, bunk faces and drawers and a long list of other items are all original A list of changes in the vessel is outlined below in Table 1. In all, much of the fabric of CANGARDA was well preserved and will be reincorporated into this restoration.

One of the more interesting elements of the project is looking at the wood parts and determining exactly how the parts were used together originally. The keen eye of Chris Morrison, one of our key shipwrights and a key shipwright of the restoration of JOYANT, was able to find panels that fit the exact structure of the cabins, even to the extent he was able to show how one tree was used in sequential pieces placed on the after cabin. Determining how each piece, a panel or a small part of the moldings was utilized has added to the authenticity of the restoration.

Metal parts are all being saved and restored. At times this is at some discussion with the Coast Guard and ABS. However, if questioned, our solution is to test weld or undertake chemical analysis of a part to determine how it can be reused. Inevitably we have been successful in preserving parts that came with the vessel. Where parts are

Restoration of CANGARDA **Items Altered from Original**
• Boiler (although the new boiler, like the original, is below decks as compared to a 1930s installation)
• Boiler and engine controls (now electronic controls as well as manual)
• Hull and ribs (Coast Guard/ABS standards imposed)
• Heads (originals in storage for museum installation later)
• Stove in galley (gas fired as compared to coal)
• Deck structure (two layers of plywood under six quarter teak) required for ABS
• Bulkhead in middle of after deck cabin missing
• Hydraulic steering vs. cable

Table 1: Items Not Original to CANGARDA

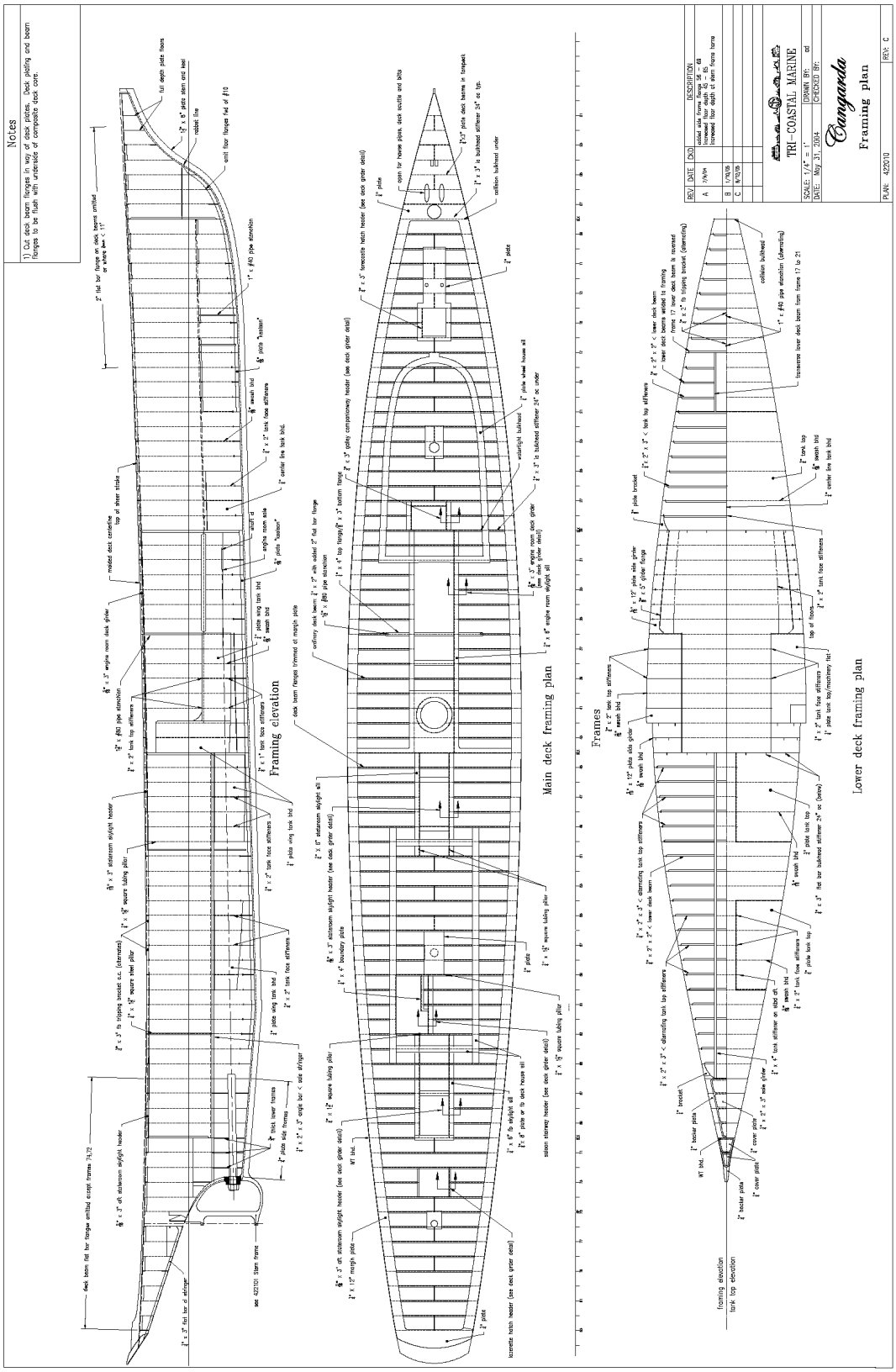


Figure 12: New Hull Framing Plan

Figure 13: Forward Deck House - The Glow of Restored 100 Year Old Mahogany

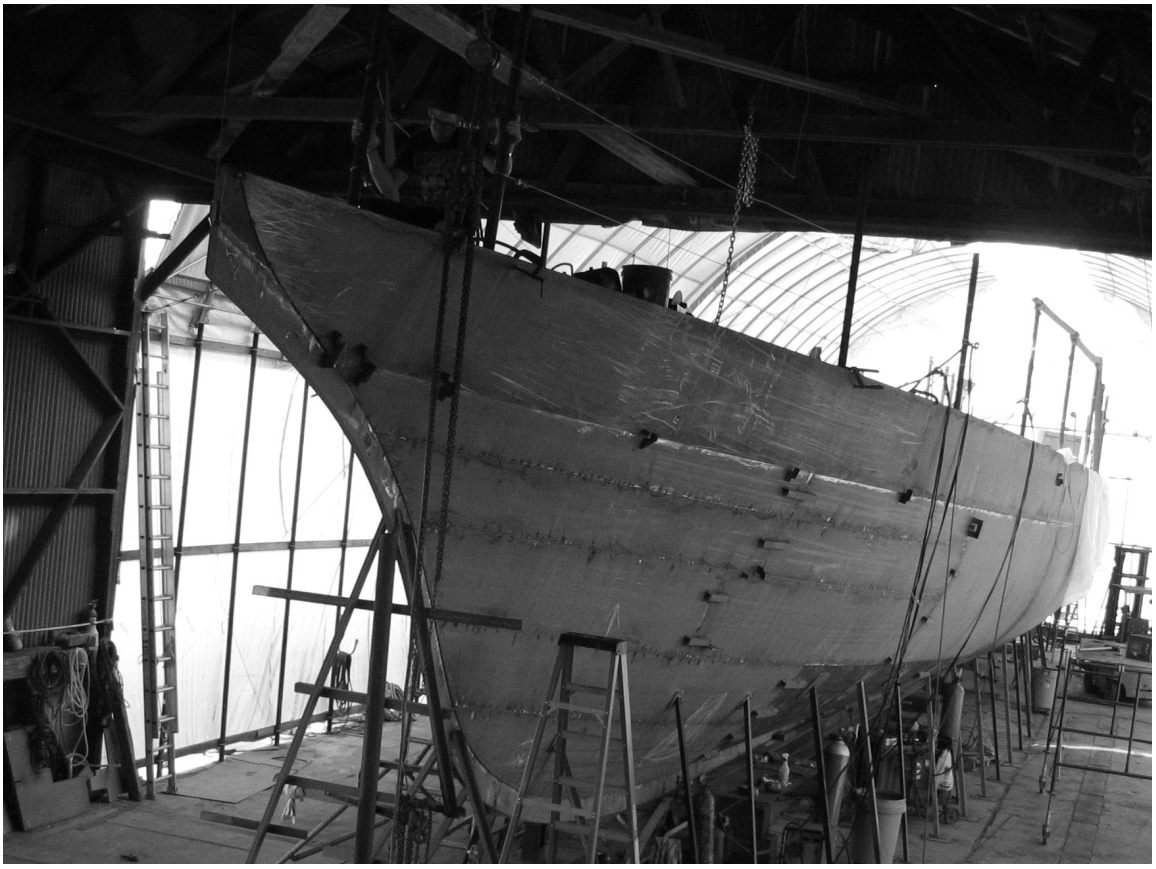


Figure 14: Hull Plated and Ready for Coating and Fairing

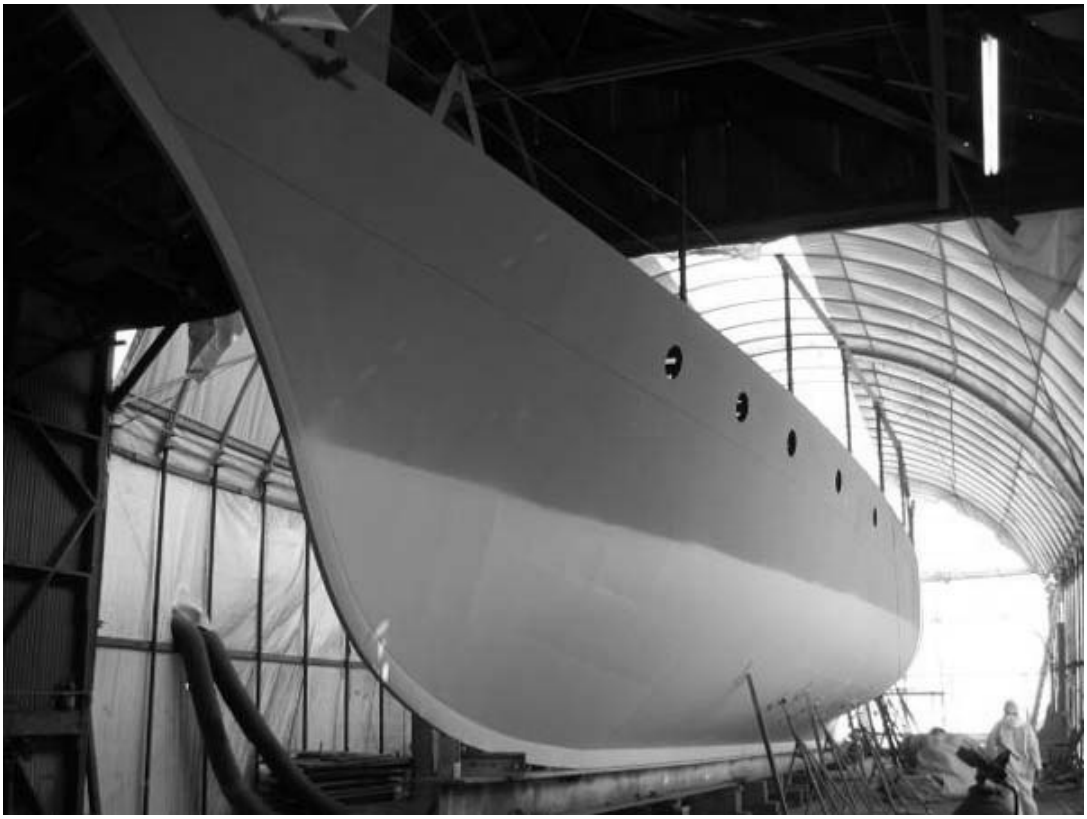


Figure 15 Initial Painting of the Faired Hull

missing a search for equivalent parts is undertaken and such parts are procured.

Execution of the Restoration

The project is being undertaken in San Francisco by Rutherford's Boat Shop. This is the same group that restored JOYANT, the 1911, 58 foot "P" class yacht designed by Nathanael Herreshoff. While the new boiler and conversion to oil burning is in line with the desire of the owner to use this vessel actively, the rest of the restoration is being undertaken with an eye to keeping every part handed down from the original vessel in its rightful place. It costs more, but the vessel is more of a restoration than a replication.
With some luck CANGARDA will be back in the water mid 2006.

The People

- **Jeff Rutherford Rutherford's Boat Works**
  Jeff is the head of the restoration of CANGARDA. He is a seasoned wooden boat enthusiast in San Francisco. He has been in the forefront of the restoration of several vessels including the 1911 P Class sloop JOYANT.

- **Andrew Davis Naval Architect Tri Coastal Marine**
  Andy is the naval architect of the restoration. Andy is experienced in the restoration and replication of many historic vessels. His degree is from the University of California. Andy's team performed the laser scans of the vessel to rebuild the hull, scanned countless drawings

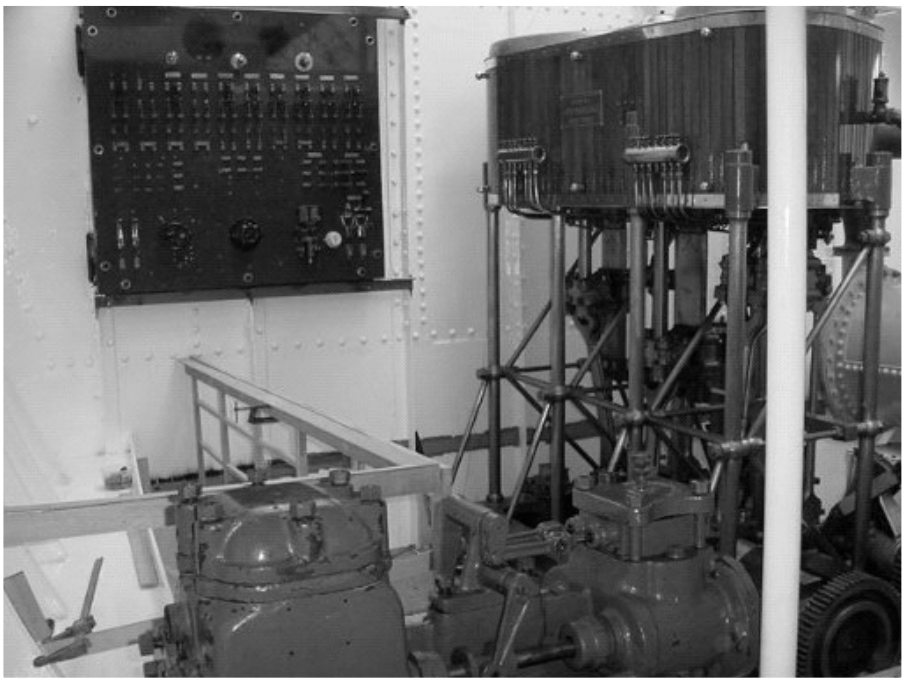


Figure 16: Main Engine, Bilge Pump and Electrical Panel in Restored Engine Room

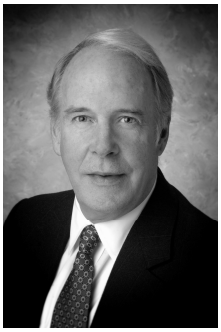
and viewed the hundreds of pictures of CANGARDA taken by earlier owners. His capability in undertaking the restoration is exceptional.

- **Ricardo Gomez, head welder**
  Ricardo is a third generation welder and his team of welders are masters of the art of steel hull construction. While most steel boats are torqued together and pulled into shape Ricardo worked with a team of New Zealand shipwrights in using an "English wheeling machine" to roll the plates and fit each into place on the long and complex curved hull.

- **Chris Morrison, head shipwright**
  Chris was a key member of the team that restored JOYANT. From New Zealand, he and Gail worked to sort the wood panels, clean each panel of the old finishes and restore the cabins, rails etc. Chris is currently working to finish the cabins and ready CANGARDA for launch.

- **Frederique Georges**
  The "master varnisher" of San Francisco. Frederique has the reputation as one of the best yacht finishers in San Francisco. Working with a crew she was responsible for the varnish work on JOYANT including the entire varnishing of the interior of the vessel. On CANGARDA the team is undertaking the varnishing of the deck cabins and other bright work of the entire vessel.

About the Authors:



Bob McNeil, a graduate of University of California, Irvine, with a Ph.D in Biochemistry, Molecular Biology and Genetics, is the Managing Director of Sanderling Ventures LLC, a successful seed and early venture partnership. An avid wilderness hiker and ocean racing enthusiast he has many racing accomplishments to his credit including;

- North American and Pacific Coast Championships in the 505 Class
- In *Zephyrus IV* first overall and course record 2000 Cape Town to Rio Race and also 2001 Middle Sea Race
- In *Zephyrus V* first in class; first to finish, course record Long Beach to Isla Navidad, Mexico and first overall and course record 2003 Montego Bay Race

For the past four seasons Bob has raced successfully along the New England coast and France in the restored P-boat *Joyant*. He is currently restoring the 125 foot *Cangarda* (1901), the last of the steam powered yachts built in the United States.

After being laid off from his warehouse job in New York City at the age of 20, **Jeffrey Rutherford** spent a year sailing in a workboat delivering grapefruit around the Caribbean. Watching men build boats on the beach with little more than a handsaw, a hammer and an axe, Jeffrey decided he wanted to try boatbuilding. He went to Maine in 1976 and apprenticed at the Northend Shipyard rebuilding a 95' passenger schooner. He returned to California where he was born, and after being a union shipwright at Pacific Drydock, he took a job as construction foreman at Pacific Fishboat Co. building a 75' wooden fishing boat. In 1982, after several years of freelance boat repair dockside, Jeff started Rutherford's Boat Shop in Richmond CA. The shop specializes in building and restoring classic yachts and general marine woodworking. Some notable projects include the 53' Edson Shock cutter *Bright Star*; the 58' N. G. Herreshoff P-Class sloop *Joyant*; a 4-oared lifeboat for the squared rigged ship *Balclutha*; and an L.F. Herreshoff Buzzards Bay 14.

Appendix

CANGARDA Statistics

Length on deck overall	126 feet
Beam deck	17 feet
Draft	7 feet
Displacement	95 tons
Engine Sullivan Triple Expansion	Main
Auxiliary Engines	Six

Masts
- Foremast with Gaff
- Main Mast with Gaff

Lifeboats

Launch	22 feet
Wherry	15 feet
Whitehall	21 feet
Coast Guard approved inflatable life rafts eight man.	Two

Accommodations
- Four staterooms aft
- Two heads aft with showers
- Captain cabin forward
- Crew bunks (eight)
- Two heads forward
- Galley with stove, refrigerator and freezer

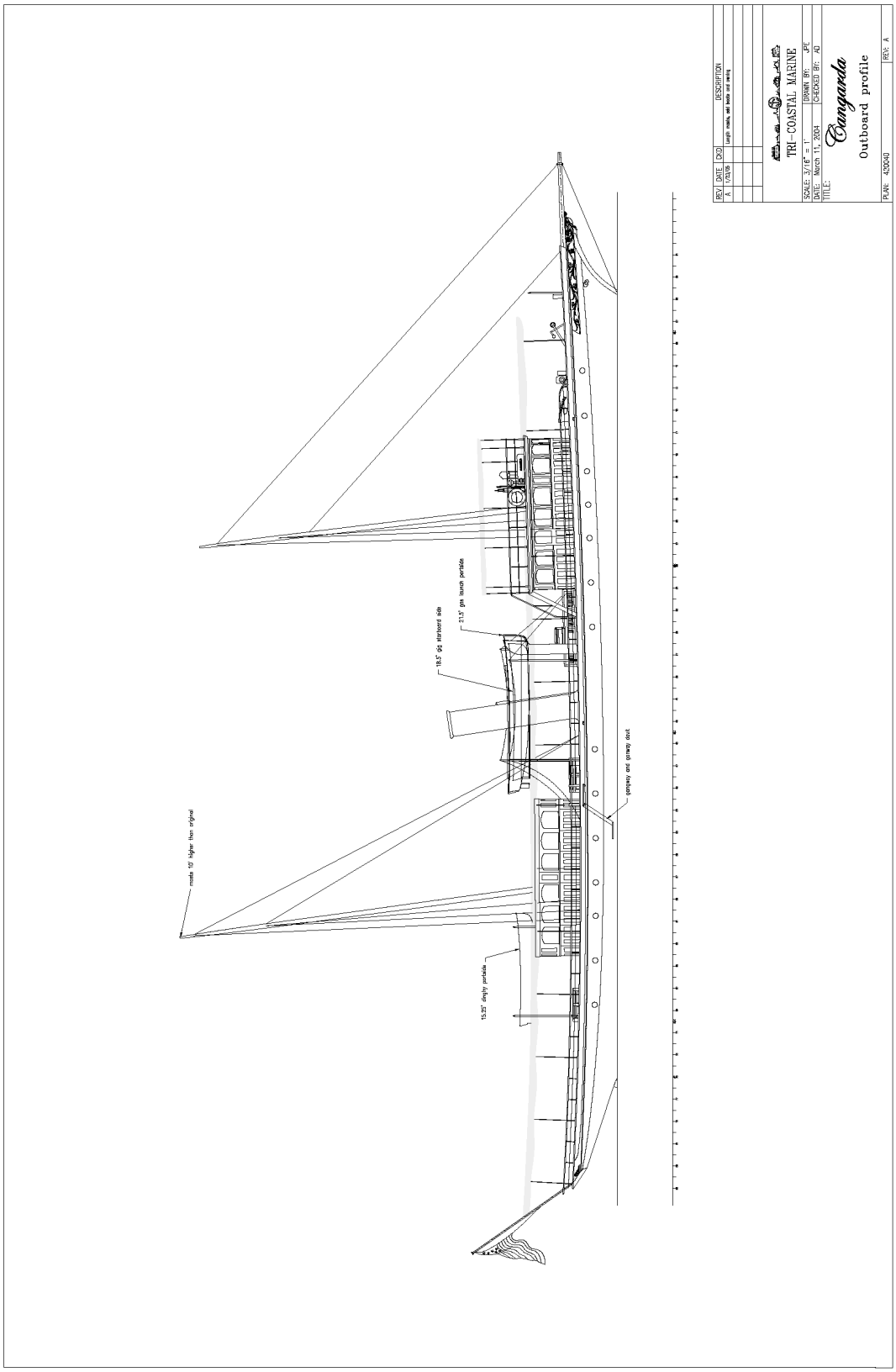


Figure A1: CANGARDA Outboard Profile

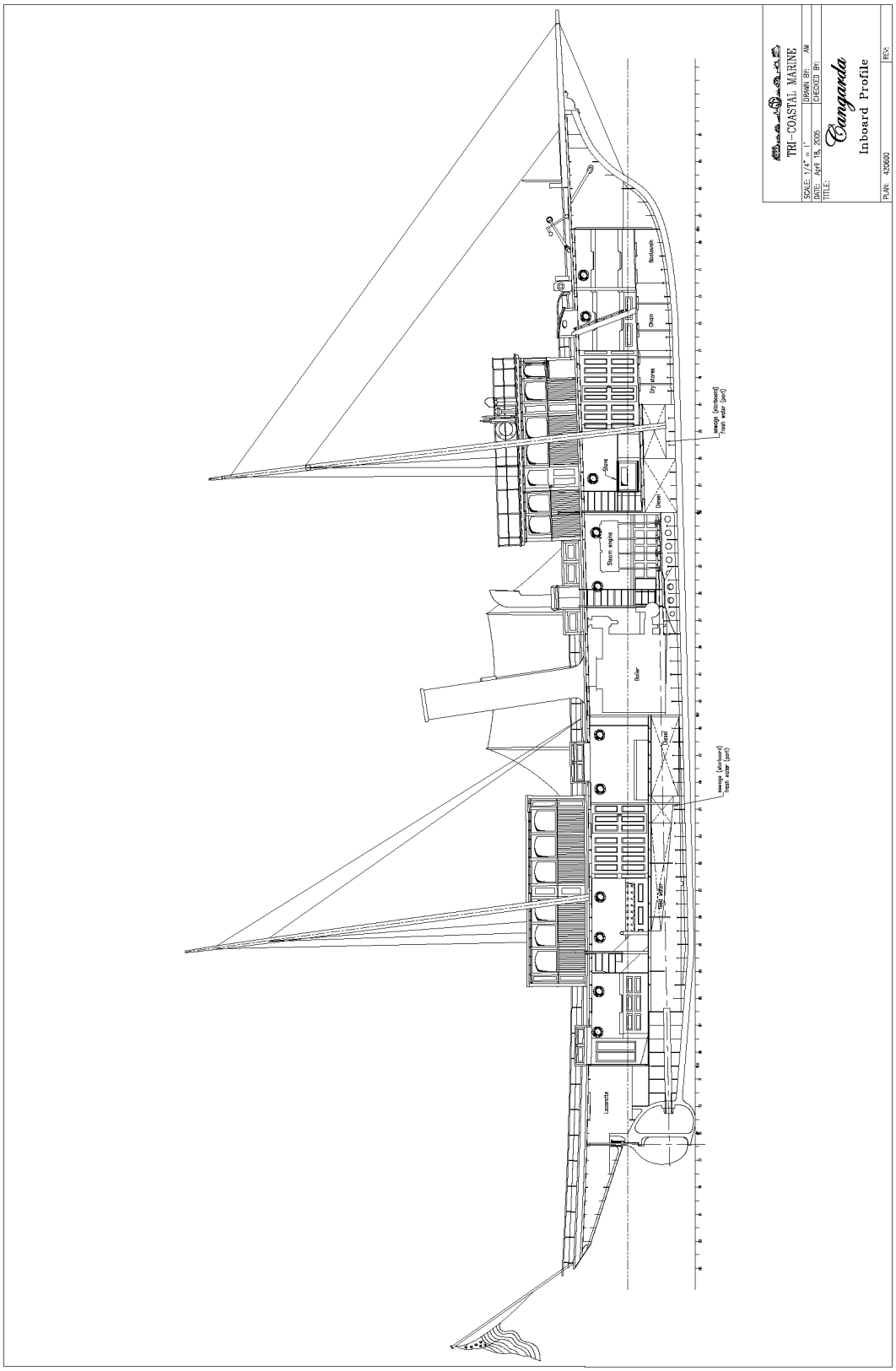


Figure A2: CANGARDA Inboard Profile

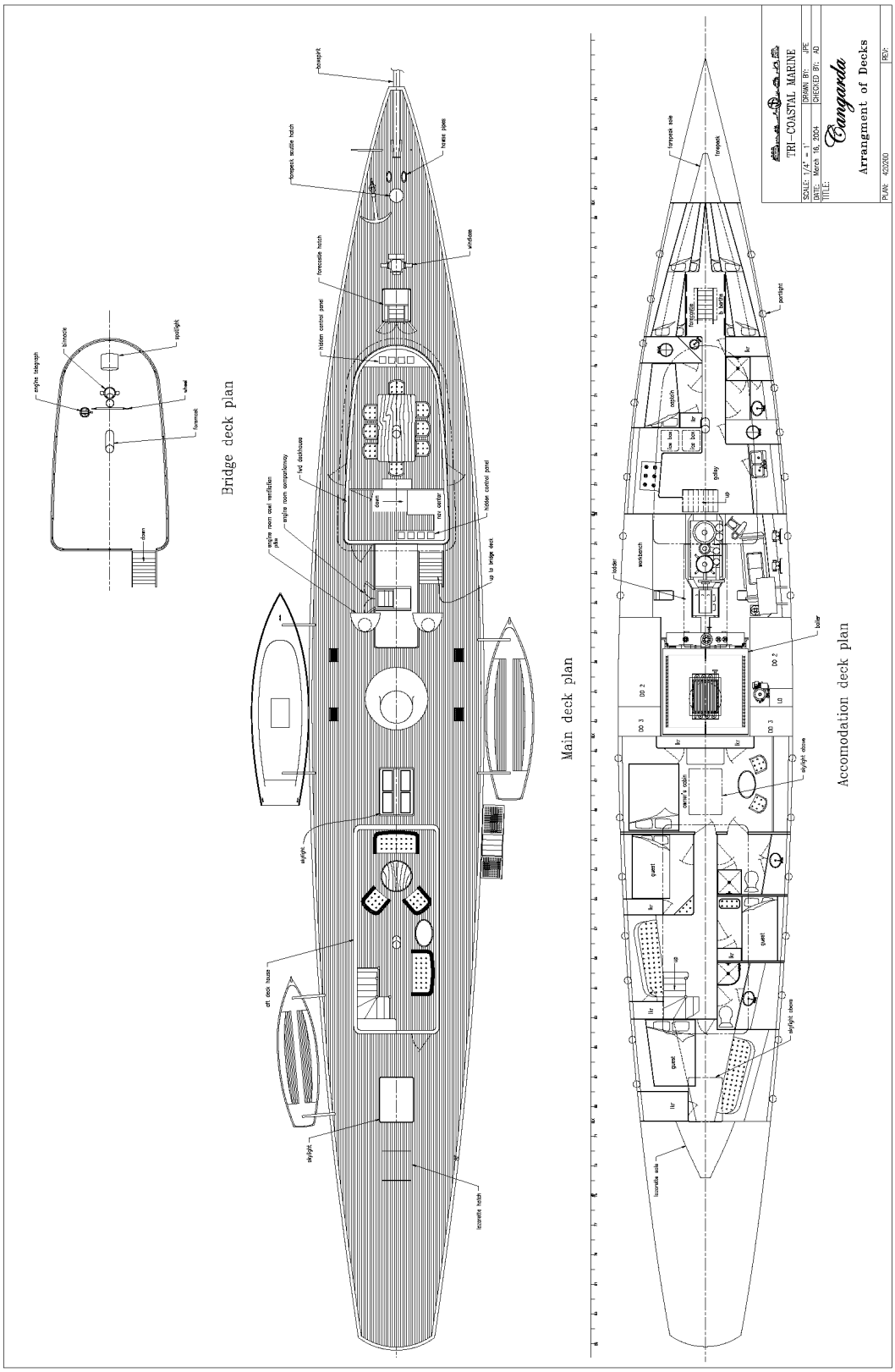


Figure A3: CANGARDA Arrangement of Decks