To whom it may concern:

On Sunday, 28 December 2014, Capt. John C. Farmer attended aboard the USS CLAMAGORE, SS-343 at her berth at Patriots Point Naval & Maritime Museum, 40 Patriots Point Road, Mount Pleasant, South Carolina for a preliminary vessel survey. This survey was on behalf of Friends of the Clamagore, Knoxville, TN, to ascertain the physical condition of the vessel. The vessel was situated in-water and only the exterior of the hull and platform deck were accessible. The vessel was surveyed without removal of any parts, including fittings, tacked floor covering, anchors, chains, fixed partitions, instruments, spare parts, and miscellaneous materials or fixed or semi-fixed items. Locked compartments or otherwise inaccessible areas precluded more in depth inspection. This survey represents the condition of the vessel on the date of the survey and is the unbiased opinion of the undersigned, but it is not to be considered an inventory or warranty either specified or implied.

Disclosure: Capt Farmer is the Chairman of the Transportation Committee of Friends of the Clamagore in Knoxville, TN and any observations, comments or suggestions rendered as a part of this survey should be viewed in light of that relationship.

Local weather condition was Sunny, 52°, Wind NW @ 3 mph, Humidity 94% and Barometer 30.07 Hg and steady. Tide state was coming from a low of -0.0 at 6:52 going to a high of 5.4 at 12:35. Tidal current was not assessed nor was water temperature or specific gravity.

**Freeboard Measurements**
NavCal’s stilling tube readable to the standard 1/8 inch was not capable of making the necessary measurements so a wooden drop-block apparatus readable to approximately +/- one inch was used in the referenced measurements (see below).

![Drop-block freeboard measurement apparatus 10’](image-url)
Lines, debris, repair and removed materials prevented more accurate measurements.

<table>
<thead>
<tr>
<th>Observed freeboard:</th>
<th>Port</th>
<th>Starboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward most bow chock</td>
<td>7.75’</td>
<td>7.75’</td>
</tr>
<tr>
<td>Forward of entrance hatch</td>
<td>7.42’</td>
<td>7.42’</td>
</tr>
<tr>
<td>Forward of Conning tower</td>
<td>6.92’</td>
<td>7.00’</td>
</tr>
<tr>
<td>Aft of Conning tower</td>
<td>6.17’</td>
<td>6.42’</td>
</tr>
<tr>
<td>Forward of aft puffer</td>
<td>5.08”</td>
<td>5.25’</td>
</tr>
<tr>
<td>Aft of aft exit area</td>
<td>N/A</td>
<td>5.08’</td>
</tr>
<tr>
<td>Forward of aft capstan</td>
<td>4.75’</td>
<td>5.00’</td>
</tr>
<tr>
<td>Approximate trim</td>
<td>3.0’ down by the stern</td>
<td>16,262,000 foot pounds</td>
</tr>
<tr>
<td>Approximate list</td>
<td>2” down to port</td>
<td>18,400 foot pounds</td>
</tr>
</tbody>
</table>

The above yields an approximate maximum draft of **17’ 0”** or 3,920,000 pounds.

The boat was heavy compared to reported drafts:


**15’ 3 ¾”** (Possibly condition “A”) General Dimensions & Data page of BOOKLET OF GENERAL PLANS 1963BUSHIPS PLAN NO. SS343-845-1841408 (after Guppy III modification)
As can be seen above the hull/ballast tanks are wasted along the entire length of the hull. This area must be audio gauged to determine the extent of wastage (percent hull thickness loss). The Main Ballast Tanks are thinner than the pressure hull and a breach on any of these tanks would result in at least partial tank flooding (below the level of the breach), loss of freeboard and could possibly cause an undesirable hull list. The Main Ballast Tanks form the outermost part of the hull sides and thus are subject to point source stresses from adjacent fixed objects such as pilings where not protected by flexible and/or inflated fending materials or apparatus. This area is of particular concern in regards vessel suitability for any form of transport.
Floodable, superstructure deck support area survey
A detailed survey of this area was possible beginning aft of the repair area shown above, preceding forward along the starboard side thence aft alone the port side to the point of origin.

Starboard side looking aft with wastage evident to hull and framing yielding an unstable deck area needing further evaluation and strengthening.

This is the starboard side looking forward from aft area with evidence of deck plating wastage as well as external ring frame wastage. This area is just aft of the open, repair area shown on the preceding page of the survey.
Soft wooden, tapered, pegs with unsampled (possibly older, red epoxy) sealant used to plug open piping evident throughout the vessel. These plugs are sold as a temporary repair of piping or small area hull breaches/punctures. They were never intended as a longtime repair and their strength and suitability is questionable. All of these must be considered for replacement with a more permanent and secure form of closure.

Wastage to the upper portion of the ballast tanks and debris are evident in this area. All debris should be removed to prevent their retaining moisture and accelerating corrosion.
Considerable wastage to the support framing of this cleat is evident rendering its strength questionable. It should not be utilized in any load bearing application until strengthened.

In areas where stainless steel supports have been added considerable wastage in adjacent members remains. This should be removed and the area coated to prevent further corrosion.
Significant ballast tank top wastage is evident here. A breach in this area would result in a complete flooding of the involved tank and significant loss of freeboard. This wastage must be investigated and if minimal the area should be needle gunned and coated to retard corrosion.

Ballast tank seepage can be removed by blowing the tanks with these purge fittings. This appears to be a labor intensive process and alternatives using the modified internal low pressure air system are preferable if possible.
Looking forward there are areas of repair with stainless steel horizontal deck beans and vertical pipe and post supports. The rounded, center area, above appears to be steel welded over external ring frames forming a “doubler” preventing access to the hull beneath the frames. The Coast Guard does not allow this type of patch and this area requires more investigation. Frames are exposed in other areas. The potential for galvanic corrosion between steel and stainless steel needs to be evaluated via the galvanic series.

Sacrificial anodes have apparently been added to the hull per the last survey recommendations. Various flexible and rigid attachment methods were noted. Flexible attachment is preferable.
This apparent vent valve does not have a pressurizing attachment. It must be verified that such a pressurizing attachment in fact exists for this tank where blowing is necessary.

The top of the above hatch is presently secured only with a ¾” Plexiglas plate. For ocean transport this plate must be removed so the hatch can be properly secured. The hatch closing mechanism and gasketing were not evaluated at the time of this survey.
Soft wooden emergency repair tapered bungs are even used to secure relatively large openings and some openings like the one above are not presently secured at all. Both of these cases must be investigated and more permanent repairs affected.

There are original, wasted sacrificial zincs evident on the upper framing in this floodable area. It was not possible to determine if shaft, rudder and lower hull sacrificial anodes were present during this survey.
Frame wastage in this area needs to be addressed to provide adequate stability for side plating. Loose plating could damage the tanks below in high wind and wave conditions.

Wiring, possibly unused, aft of the conning tower compartment, is not properly secured in this area. The Coast Guard requires stainless steel tie-wraps as supports for wiring not in conduit.
These vent closures appear to be intact but corroded. Their functionality was not evaluated.

Wastage to framing, hull and especially outer deck shell in forward hull side access steps area. Saclely corrosion of undetermined extent is evident to the upper portion of the tanks in this area of the hull.
Forward escape hatch area wastage is especially evident to upper deck plating shown here.

Shafting for the forward capstan and anchor windless were not closely inspected and are inoperable for lack of hydraulic pressure source.
Wastage is especially evident on the port side that can not be seen from the dock. Marine growth below the water appears to be more pronounced that on the sunny side of the hull.

This line take-up was not examined and is inoperative.
Probably unused wire not properly secured and some deck supports partially removed.

Ballast tank wastage is also evident on the port main ballast tank tops.
Poorly supported and unfastened deck shell plating on port side should be addressed.

Localized, unexplained frame wastage is evident especially in the port aft area.
This exposed area clearly shows wastage to the ballast tanks in spite of some form of protective coating now spot compromised.

Localized external ring frame and longitudinal member damage looking forward on port side is evident in areas as above. This is very troubling as concerns the reason of this accelerated spot corrosion and its resulting hull strength loss.
This entire area needs further investigation as considerable wastage is evident. The purpose of the vertical stainless steer rod and ball joint were not ascertained and this arrangement was not seen in any other area of the vessel.

Evidence of ballast tank and pressure hull wastage as well as standing water in the recess between the hull joint is evident. The tank purge fitting here has been sheered off and accidental opening of the internal vent would result in tank flooding. This should be addressed/repaired ASAP!
Topsides area findings/comments

There is an apparently a preassembled towing sling around the forward most puffer enclosure. The ultimate strength of this sling attachment point needs to be researched before it is utilized as a towing attachment point.

Bow forward area is wasted and inaccessible from lower side for further strength investigation.
This added 90” long, fore and aft and 29” athwart ship visitor access with a 51” height now replaces the forward torpedo loading hatch. This hatch must be made water tight before movement of the sub.

Very limited shore power (probably lighting only) now comes aboard on the starboard side of the Conning Tower vice the Control Room originally intended. External AC power switch boxes must be mounted internally and conning tower penetrations sealed for transport and should be considered for change now.
These aft mooring bits are in use and assumed to be in serviceable condition with proper support.

The visitor exit hatch, like the forward hatch, does not have “dogs” for the hatch door and must be secured for transit.
Internal vessel study

FORWARD TORPEDO ROOM

The forward end of the forward torpedo room has Plexiglas shields preventing access to this area.

The after end of the forward torpedo room is where the visitor access comes into the hull. The sonar transducer hoist was not observed. This area appears to be relatively well maintained.
NAV-CAL Marine Services

FORWARD BATTERY COMPARTMENT

Through this hatch is access to the forward battery compartment and Officers Quarters. The batteries are located below this platform deck and the access hatch was locked so that area was not observed. It has been reported that the major portion of the electrolyte has been removed. This needs to be verified and any remaining electrolyte neutralized and removed.

Several outer areas here were inexcusable and not inspected but seemed to be intact and sound.
Part of the Control Room was inaccessible because Plexiglas shields. Some valve control handles have been removed and I assume these are the internal vent valves. The ladder to the left here leads up but is blocked at the top.

There was no access to the conning tower or gun access area so they were not inspected. Some apparent corrosion was visible through the blockage. One removed access ladder is being used in the external hull repair area and subject to being lost over the side. It should be secured within the hull.
Access below the platform deck here was blocked and thus not observed.

Access to the radio room and its associated teletype equipment was blocked. I was not able to make a listing of the equipment here like some I used in sending messages in Air Force MARS years ago. I still have teletype repair tools.
NAV-CAL Marine Services

CONNING TOWER

The Conning Tower and all areas above the platform deck were inaccessible and thus not observed. These areas need to be inspected for wastage and possible strength compromise.

Access to this gulley area was blocked as was the hatch in the background but the messing area was open. The area beneath the platform deck here was not observed.
This area was relatively well maintained but the inaccessible area below the engine room platform deck was dirty and trash was evident. CLAMAGORE DOES have the original four diesel engine generators (#2 removed in earlier Guppy mods. on some other boats).

The after engine room was similar to the forward as regards the areas above and below the platform deck where the high pressure air compressors are situated. I assume the missing value handles are on vent valves for safety.
These are the propulsion controls for applying DC power to the motors connected to the propeller shafts.

I believe it would be preferable to remove the altimeter above even if the meter location had to be blocked off. I will try to locate a suitable meter with the same form factor.
This is the visitor exit hatch area in the after torpedo room. The after torpedo room is very similar to the forward one except it smaller.

This after visitor hatch, like the forward one, has no means to secure the former watertight door. The locking “dogs” have been removed and the gasket seems to be soft porous material incapable of making a watertight seal.
**Summary findings**

1) CLAMAGORE was resting heavy in the water at 17’ 0” vice 15.3’ or less she should have been and down 3’ by the stern.
   
   She needs to have all her ballast tanks blown and draft remeasured.

2) As can be seen above the hull/ballast tanks are wasted along the entire length of the hull.
   
   This area must be audio gauged to determine the extent of wastage (percent hull thickness loss).

3) Soft wooden, tapered, pegs with unsampled (possibly older, red epoxy) sealant used to plug open piping evident throughout the vessel. These plugs are sold as a temporary repair of piping or small area hull breaches/punctures. They were never intended as a longtime repair and their strength and suitability is questionable.
   
   All of these must be considered for replacement with a more permanent and secure form of closure.

4) Wastage to the upper portion of the ballast tanks and debris are evident in this area.
   
   All debris should be removed to prevent their retaining moisture and accelerating corrosion.

5) Considerable wastage to the support framing of this cleat is evident rendering its strength questionable.
   
   It should not be utilized in any load bearing application until strengthened.

6) In areas where stainless steel supports have been added considerable wastage in adjacent members remains.
   
   This should be removed and the area coated to prevent further corrosion.

7) Significant ballast tank top wastage is evident here. A breach in this area would result in a complete flooding of the involved tank and significant loss of freeboard.
   
   This wastage must be investigated and if minimal the area should be needle gunned and coated to retard corrosion.

8) Ballast tank seepage can be removed by blowing the tanks with these purge fittings.
   
   This appears to be a labor intensive process and alternatives using the modified internal low pressure air system are preferable if possible.

9) The rounded, center area, above appears to be steel welded over external ring frames forming a “doubler” preventing access to the hull beneath the frames.
   
   The Coast Guard does not allow this type of patch and this area requires more investigation.

10) This apparent vent valve does not have a pressurizing attachment.
    
    It must be verified that such a pressurizing attachment in fact exists for this tank where blowing is necessary.

11) The top of the above hatch is presently secured only with a ¾” Plexiglas plate.
    
    For ocean transport this plate must be removed so the hatch can be properly secured.

12) Soft wooden emergency repair tapered bungs are even used to secure relatively large openings and some openings like the one above are not presently secured at all.

    Both of these cases must be investigated and more permanent repairs affected.

13) Localized external ring frame and longitudinal member damage looking forward on port side is evident in areas as above. This is very troubling as concerns the reason of this accelerated spot corrosion and its resulting hull strength loss.
14) The tank purge fitting here has been sheered off and accidental opening of the internal vent would result in tank flooding.
   This should be addressed/repaired ASAP!
15) This added 90” long, fore and aft and 29” athwart ship visitor access with a 51” height now replaces the forward torpedo loading hatch.
   This hatch must be made water tight before movement of the sub.
16) Very limited shore power (probably lighting only) now comes aboard on the starboard side of the Conning Tower vice the Control Room originally intended.
   External AC power switch boxes must be mounted internally and conning tower penetrations sealed for transport and should be considered for change now.
17) This area was relatively well maintained but the inaccessible area below the engine room platform deck was dirty and trash was evident.
18) I believe it would be preferable to remove the altimeter above even if the meter location had to be blocked off. I will try to locate a suitable meter with the same form factor.
19) This after visitor hatch, like the forward one, has no means to secure the former watertight door. The locking “dogs” have been removed and the gasket seems to be soft porous material incapable of making a watertight seal.

**Suggested course of action**

After it warms up in Charleston (March 45-70°) all of the ballast tanks need to be thoroughly blown to increase the vessel freeboard. Ultrasonic thickness gauge readings need to be taken along the external ballast tanks to determine the extent of hull wastage. The Coast Guard standard for requiring crop and replace on passenger vessels is greater than 22% wastage from design/as built plate thickness. At least one run of audio gauge measurements needs to be made just above the waterline. Based on these measurements additional measurements may be required to ascertain the extent of any wasted areas. NavCal is now equipped to perform these measurements.

Respectfully submitted,

*John C. Farmer*

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Captain