NAVSEA
STANDARD ITEM

FY-15

ITEM NO: 009-30
DATE: 29 JUL 2011
CATEGORY: II

1. SCOPE:

1.1 Title: Boiler Sample Tubes; inspect

2. REFERENCES:

2.1 S9221-C1-GTP-010, Repair and Overhaul Main Propulsion Boilers

3. REQUIREMENTS:

3.1 Remove tubes using tube-sampling methods in accordance with Paragraph 3.4 of 2.1.

3.1.1 Cut generating tubes removed as samples 8 to 10 inches above the water drum.

3.2 Identify and metal-tag tubes, tube stubs, and tube sections removed, with ship's name and hull number, Work Item number, boiler number, tube designation, bottom and top of sections, segment sequence, upstream side (furnace face), and downstream side of gas flow.

3.2.1 Cut tube removed into 3-foot minimum segments and split longitudinally by mechanical method with tube dry (no oil) so that upstream side (furnace face) half is split from side downstream of gas flow half.

3.2.1.1 There shall be 2 distinct, individual halves to each segment, tube stub, and bend.

3.2.1.2 Each half (waterside/steamside and fireside) shall remain intact.

3.2.2 Identify and metal-tag each segment and half in accordance with 3.2 so that full length of tube may be reconstructed and placement oriented.

3.3 Inspect tube segments for the following:

3.3.1 Steamsides/watersides:

3.3.1.1 Oil deposits

3.3.1.2 Loose sludge

3.3.1.3 Hard baked-on sludge

3.3.1.4 Scale

3.3.1.5 Scabs/tubercles

3.3.1.6 Pitting

3.3.1.7 High temperature oxides

3.3.1.8 Waterside grooves

3.3.1.9 Corrosion fatigue fissures

3.3.1.10 General waterside thinning

3.3.1.11 Waterside burning

3.3.1.12 Waterside abrasion

3.3.1.13 Die marks

3.3.1.14 Steam tracking

3.3.1.15 Stress corrosion cracking (caustic embrittlement)

3.3.2 Firesides:

3.3.2.1 General fireside thinning

3.3.2.2 Fireside burning

3.3.2.3 Tube enlargement

3.3.2.4 Swaging

3.3.2.5 Sagging

3.3.2.6 Warping

3.3.2.7 Heat blisters

3.3.2.8 Thermal cracks

3.3.2.9 Mechanical fatigue cracks

3.3.2.10 Steam gouging

3.3.3 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.3 to the SUPERVISOR.

3.4 Collect samples (equal to a heaping tablespoon each) of waterside soft and hard deposits for each boiler.

3.4.1 Soft deposits - Place the tube segments in a vise with the waterside up and wirebrush watersides. Collect loose residue in a bottle. Label bottle with the title Soft Deposits, ship, boiler number, and tube number.

3.4.2 Hard deposits - Place the tube segment in a vise with the waterside up and power wirebrush watersides to remove loose residue. Crimp the tube segment slowly allowing flakes of hard sludge to fall back into the tube. Collect the loose flakes in a bottle. Label bottle with title Hard Deposits, ship, boiler number, and tube number.

3.5 Package tubes, deposit samples, and a copy of report (3.3.3) and send to a laboratory qualified to accomplish chemical analysis.

3.5.1 Analyze the tube samples for the following:

3.5.1.1 Tube wall thickness at zero, 90, 180, and 270-degree positions

3.5.1.2 Extent of pitting (major pit depths and average overall pitting)

3.5.1.3 Thickness of hard scale mineral deposits

3.5.2 Analyze deposit samples for specific mineral composition in percentages of calcium, magnesium, and silicon oxide.

3.5.3 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.5.1 and 3.5.2 to the SUPERVISOR.

4. NOTES:

4.1 Sample tube(s) replacement will be included in the invoking Work Item.