



DEPARTMENT OF THE NAVY

NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362-5101

IN REPLY REFER TO

9245
OPR: 05X71
Ser: 05X7/29
9 March 1993

From: Commander, Naval Sea Systems Command
To: DCMAO Cleveland
Anthony J. Celebreeze Federal Building
1240 East Ninth St.
Cleveland, OH 44199-2064
(Attn: Thomas Kranz, Chief, East Branch, Section C)

Subj: QUALITY ASSURANCE LETTER OF INSTRUCTION (QALI) FOR NAVSEA
MAIN PROPULSION SHAFTING CONTRACTS WITH ERIE FORGE AND
STEEL, INC., ALL INCLUSIVE

Ref: (a) NAVSEA ltr 9245 OPR: 05X71 Ser: 024/05X7/113 dtd 7
August 1992
(b) DCMDM-GCQEC (Keffer) ltr dtd 2 September 1992
(c) Meeting between DCMDM-GCQEC and NAVSEA at Erie
Forge & Steel, Inc., Erie, PA, on 23 & 24 November
1992
DCMDM-GCQEC (Keffer) ltr dtd 16 December 1992

Encl: (1) Revised Quality Assurance Letter of Instruction for
Main Propulsion Shafting at Erie Forge & Steel,
Inc.

1. In order to guarantee a more uniform inspection of main propulsion shafting at the major shaft manufacturers, a QALI was provided, reference (a). Relief in certain areas of the QALI was requested by DCMDM-GCQEC, reference (b). A subsequent meeting, reference (c), was held to discuss the requested relief and to verify the documentation necessary to support it. Reference (d) provided the QALI with the changes agreed to during the meeting.

2. We have reviewed the revised QALI, enclosure (1), and approve its use at Erie Forge & Steel, Inc. It is requested that you provide written acknowledgement of receipt of this QALI, along with date of implementation.

3. If you have any questions regarding this letter or the enclosed QALI, call Mark Umholtz, NAVSEA 05X71, A/V 332-2712 or commercial (703)602-2712.

R. Kaminsky
C. R. CROCKETT
BY DIRECTION

copy to:
QAR (c/o Erie Forge & Steel, Inc. Bob Keffer)

Enclosure 1

QUALITY ASSURANCE LETTER OF INSTRUCTION
FOR
MAIN PROPULSION SHAFTING

1. **PURPOSE:** This Quality Assurance Letter of Instruction (QALI) is issued for the manufacture and repair of all '2S Cog' main propulsion shafting. Assurance of the contractors compliance to specifications in conjunction with DLAM 0200.5 instructions is required. Mandatory Inspection Points (MIPS) shall be followed as indicated, unless specific approval is obtained from the Naval Sea Systems Command (NAVSEA) to deviate from this instruction.

2. **DEFINITIONS:** The work listed below used throughout the QALI are defined here to clarify intent to the Quality Assurance Representative (QAR):

PERFORM (Physically accomplish tests and/or inspections)

WITNESS (Observe contractors performance of tests and/or inspections)

VERIFY (Review the contractors documented evidence of tests and/or inspections)

3 **SPECIFIC INSTRUCTIONS:**

A. NEW MANUFACTURE:

1. The QAR shall VERIFY that all manufacturing plans, including changes that are developed by the contractor, meet the requirements of the contract and specifications 100%. Drawings issued to the shop for manufacture and inspection shall be verified against contract requirements to assure that all appropriate requirements have been incorporated. Internal travelers, work orders, inspection instructions, etc., shall be reviewed against all contract, drawing, and inspection requirements to assure compliance.

2. The QAR shall WITNESS Total Indicated Runout (TIR) 100%. This inspection shall be performed prior to sleeve installation with the body of the shaft between the sleeves, sleeve fit areas, and tapers, and bore completely finished machined. Propeller nut threads, keyways, and end details may be completed after this measurement of TIR. A final TIR with the shaft assembly completely machined, prior to installation of the fiberglass covering and packaging, shall be WITNESSED 100%.

3. The QAR shall PERFORM dimensional inspection of the following critical dimensions on all hardware 100%.

- *a) Sleeve fit area, forward & aft.
- *b) Flange fit areas, forward & aft.
- *c) Bore transition area.
- *d) Bore plug area.

See attached specific characteristics per area listed

4. The QAR shall PERFORM all interference fit calculations for shaft sleeves and bore plugs. The QAR shall assure that differences in temperature between the sleeve, micrometers, and shaft are compensated mathematically to assure that specified interference fits are achieved prior to installation.

5. The QAR shall WITNESS all inboard coupling and propeller taper ring gage fits 100%. The QAR shall assure that the minimum required blue contact between the gage and the shaft meets the 80% minimum contact and the required gage standoff measurements are verified with and without keys installed. The QAR shall assure that temperatures of the shaft and ring gages or inboard coupling and plug gage are the same. Any temperature difference must be compensated for mathematically and documented on contractor inspection records.

NOTE: A temperature difference of one degree between the shaft and inboard coupling ring gage can affect gage standoff by fifteen thousandth (0.015) of an inch.

6. The QAR shall WITNESS shaft balancing on a sampling basis.

7. The ^{QAR} shall WITNESS all destructive testing for all hardware once each quarter

8. The QAR shall VERIFY that the contractor has qualified personnel performing the required nondestructive testing.

9. The QAR shall WITNESS all nondestructive testing performed by the contractor on a sampling basis in accordance with DLAM 8200.5.

10. The QAR ^{shall} WITNESS all hydrostatic sleeve testing 100%

11. The QAR shall WITNESS all fiberglass spark tests on a sampling basis

12. Heat treat record review 100%

13. The QAR shall WITNESS all part marking, preservation, and packaging 100% to assure contract requirements have been met.

14. The QAR shall VERIFY acceptability of results of sleeve fit 100%

15. The QAR shall WITNESS all straightening operations 100%

16. The QAR shall WITNESS sandpacking 100%

17. The QAR shall PERFORM purchase order reviews on all purchase orders issued under applicable contracts.

18. The QAR shall VERIFY that all inspection and testing records conform to the contract and drawing requirements 100%.

19. The QAR shall PERFORM a 100% review of the final inspection report. The QAR shall assure that all contract requirements have been documented in accordance with the Contract Data Requirements List attached to each contract. The QAR shall, upon completion of review, sign and stamp each inspection report prior to submission to NAVSEA.

20. Authority to accept TYPE II minor nonconformances is WITHHELD, unless otherwise directed by NAVSEA. All requests for deviations and waivers shall be forwarded with QAR comments to NAVSEA for review and disposition.

B. REFIT:

1. The QAR shall PERFORM all required inspections for both Pre-Repair and Repair as listed in paragraph 3.A. above in addition to the following.

2. The QAR shall PERFORM a 100% review of the contractors Pre-Repair inspection planning to assure that all requirements of the applicable contract, Technical Repair Standard (TRS), and drawing are met.

3. The QAR shall PERFORM 100% review of the contractors proposed repair actions to verify that the repairs in the Pre-repair proposal covers all noted discrepancies in the Pre-repair inspection report.

4. The QAR shall WITNESS on a sampling basis all repairs performed to the item, in accordance with DLAM 8200.5.

5. The QAR shall VERIFY 100% that all Pre-repair and Repair inspection and test reports meet the requirements of the contract. The QAR shall indicate this review by signing and stamping the cover page of the inspection report prior to submission to NAVSEA.

C QAR RECORDS:

1. The QAR shall redelegate as necessary in order to accomplish the requirements of this QALI. The QAR shall maintain records in accordance with DLAM 8200.5, documenting the requirements of this QALI. These records shall be available for review by representatives of NAVSEA at any time. Retention of inspection records shall be five years, unless otherwise directed by NAVSEA.