

ARMED SERVICES BOARD OF CONTRACT APPEALS

Appeal of --)
)
Bath Iron Works Corp.) ASBCA No. 54544
)
Under Contract No. N00024-98-C-2306)

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OPINION BY ADMINISTRATIVE JUDGE JAMES

This appeal arises from the contracting officer's (CO) 16 January 2004 final decision denying the \$1,341,129 claim of Bath Iron Works Corp. (BIW) under the captioned contract to recover its costs incurred to repair and replace fuel oil fill and transfer (FOFT) piping damaged by corrosion during construction of the DDG 90 guided missile destroyer. The Board has jurisdiction of the appeal under the Contract Disputes Act of 1978, 41 U.S.C. § 607. After a 5-day hearing, the parties submitted post-hearing and reply briefs. The Board is to decide both entitlement and quantum (tr. 1/15).

FINDINGS OF FACT

1. On 6 March 1998 the Naval Sea Systems Command (NAVSEA) awarded Contract No. N00024-98-C-2306 (the contract) to BIW to construct six DDG 51 Class Guided Missile Destroyers, including DDGs 90 and 92 on a fixed-price incentive fee basis. The Navy's Supervisor of Shipbuilding Conversion & Repair, Bath (SUPSHIP), was designated to administer the contract. (R4, tab 1 at 2-13)

2. The contract included clause H-11 "NAVSEA 5252.228-9105 INSURANCE-PROPERTY LOSS OR DAMAGE-LIABILITY TO THIRD PERSONS (FT) (JAN 1990) (MODIFIED) (JUL 1997)" (the Insurance clause), which provided in pertinent part:

(a) The Contractor shall not, unless otherwise directed or approved in writing by the Department, carry or incur the expense of any insurance against any form of loss of or damage to the vessels or to the materials or equipment therefor to which the Government has acquired title or which have been furnished by the Government for installation by the Contractor. The Government assumes the risks of loss of and damage to the vessels and such materials and equipment which would have been assumed by the underwriters if the Contractor had procured and maintained throughout the term of this contract, on behalf of itself and the Government, insurance with respect to the vessels and such materials and equipment for full value against pre-keel and post-keel laying risks (i) under the forms of Marine Builders Risk (Navy Form-Syndicate) policy . . . as set forth in the pamphlet entitled “Standard Forms of Marine Builders Risk (Navy Form-Syndicate) and War Damage Insurance Policies referred to in Vessel Contracts to the Bureau of Ships,” dated 23 November 1942, or (ii) under any other policy forms which the Assistant Secretary of the Navy (RD&A), Insurance Office shall determine were customarily carried or would have been customarily carried by the Contractor in the absence of the foregoing requirement that the Contractor not carry or incur the expense of insurance, . . . provided, further, that under the above identified policies or under this requirement the Government does not assume any risk with respect to, and will not pay for any costs of the Contractor for the inspection, repair, replacement, or renewal of any defects themselves in the vessel(s) or such materials and equipment due to (A) defective workmanship, or defective materials or equipment performed by or furnished by the Contractor or its subcontractors or, (B) workmanship, or materials or equipment performed by or furnished by the Contractor or its subcontractors which do(es) not conform to the requirements of the contract, whether or not any such defect is latent or whether or not any such non-conformance is the result of negligence; provided, further, that under the above identified policies or under this requirement the Government does not assume the risk of and will not pay for the costs of any loss, damage, liability or expense caused by, resulting from, or incurred as a consequence of delay and disruption of any type whatsoever. . . . Notwithstanding the foregoing, the

Contractor shall bear the first \$50,000 of loss or damage from each occurrence or incident the risk of which the Government otherwise would have assumed under the requirements of this paragraph.

. . . .

(e) In the event of loss of or damage to any of the vessels or any of the materials or equipment therefor which may result in a claim against the Government under the insurance requirements of this contract, the Contractor promptly shall notify the [CO] of such loss or damages, and the [CO] may, without prejudice to any other right of the Government, either:

(i) Order the Contractor to proceed with replacement or repair in which event the Contractor shall effect such replacement or repair. The Contractor shall submit to the [CO] a request for reimbursement of the cost of such replacement or repair together with such supporting documentation as the [CO] may reasonably require, and shall identify such request as being submitted under this insurance requirement. If the Government determines that the risk of such loss or damages is within the scope of the risks assumed by the Government under this requirement, the Government will reimburse the Contractor for the reasonable, allowable cost of such replacement or repair, plus a reasonable profit, less the deductible amount specified in paragraph (a) of this requirement. Payments by the Government to the Contractor under this insurance requirement are outside the scope of and shall not affect the pricing structure of the contract (firm fixed price or incentive type arrangement, as applicable), and are additional to the compensation otherwise payable to the Contractor under this contract

(R4, tab 1 at 223-28)

3. The 1942 “Marine Builders Risk (Navy Form-Syndicate) policy” to which ¶ (a)(i) of the Insurance clause refers indemnifies a ship owner for –

. . . all risks, including fire, while under construction and/or fitting out

....

This insurance also specifically [is] to cover loss of or damage to the hull or machinery, through negligence of master, mariners, engineers, or pilots . . . or through any latent defect in the machinery or hull, or from explosion or other causes . . . causing loss of or injury to the property hereby insured, provided such loss or damage has not resulted from want of due diligence by the owners of the vessel . . . or by the manager

The 1942 policy did not exclude “faulty design” from the “all risks” coverage. (App. supp. R4, tab 305A at 4-5)

4. In about 1980, a shipbuilder interpreted the Navy’s 1942 Insurance clause to cover the cost of correcting the shipbuilder’s defective workmanship. In 1980 NAVSEA modified the Insurance clause to except the costs “for the inspection, repair, replacement, or renewal of any defects *themselves* in the vessel(s) . . . due to . . . defective workmanship” (emphasis added). Such term was intended to bar recovery of the costs to re-do defective work itself, but not to bar recovery of the costs of fortuitous casualties resulting from such work. The 1981 Supplemental Appropriations and Rescission Act, Pub. L. No. 97-12, 95 Stat. 29, *inter alia* reflected the foregoing distinction and prohibited paying the costs “for correction of the [defense] contractor’s own defects in materials or workmanship incident to the normal course of construction (. . . which do not constitute a fortuitous or casualty loss).” (App. supp. R4, tabs 254A-261A, 303A; tr. 4/8-10, 5/84-85)

5. Prior to DDG 90, BIW had constructed DDGs on inclined building ways. DDG 90 was the first DDG BIW constructed on its “land level transfer facility” in a level position. (Tr. 1/61-62, 115-16, 140, 146)

6. The DDG 90’s FOFT system specified in contract specification § 541 included deck fill connections, fuel tanks, piping, pumps, and isolation valves designed to receive fuel at five topside fill stations, to transfer such fuel by a network of piping into six groups of receiving, storage and overflow/expansion tanks, and to transfer seawater drawn from the fire main between such tanks so as to control the vessel’s stability in list and trim at sea (R4, tab 2 at 366-75, tab 10 at 790; tr. 1/33-36, 60, 67-70).

7. Contract specification § 042 defined a (a) “contract drawing” as one from which, “unless otherwise specified on the drawing, no departure from details . . . shall be made without specific approval,” and (b) “contract guidance drawing” as one –

that illustrates design features of the ship . . . [but] does not necessarily depict, nor is it intended to depict, all features and details of the systems . . . to which it relates. Contract guidance drawings are furnished . . . “AS IS” and without warranty or representation as to their accuracy, completeness, or suitability for use for any purpose. . . . Departure from specific details may be made without approval provided an acceptable design results. . . .

Among the contract guidance drawings, specification § 042 listed drawing No. 802-5774118, Rev. B, “Ship Fuel Fill, Transfer, Services and Overflow System Diagram.” (App. supp. R4, tab 18A (A) at 2-5, 32; tr. 1/41-42)

8. Drawing No. 802-5774118, Rev. B, is a set of six schematic diagrams that depicted FOFT piping plans and an elevation with lines showing the direction of fuel flow, but did not depict the dimensions, sizes, connection and support details, and precise arrangement of such piping within DDG 51, and stated:

THE SYSTEM SCHEMATICALLY DEPICTED HEREON IS A FUNCTIONAL REPRESENTATION OF SPECIFIC CONFIGURATION . . . FEATURES. IT DOES NOT, AND IS NOT INTENDED TO DEPICT ALL SYSTEM DETAILS RELATING TO CONFIGURATION

(App. supp. R4, tab 16A at 6) We find that Drawing No. 802-5774118 made BIW responsible to select DDG 90’s FOFT piping configuration, dimensions and arrangement.

9. Specification § 505c1 provided that “CRES [corrosion resisting steel] piping MIL-P-1144 or ASTM A312 (DDG 89 and Follow) . . . shall be in accordance with . . . NAVSEA No. 802-5959353,” and § 505e1 provided:

Unnecessary high and low points shall be avoided in the arrangement of piping. Where necessary for the proper functioning of the system . . . drains shall be installed at the . . . low points.

(R4, tab 4 at 652, 693) NAVSEA drawing No. 802-5858353, “MILITARY STANDARD 777D MODIFIED FOR DDG 51 CLASS SCHEDULE OF PIPING . . . AND . . . PIPING COMPONENTS” required “Pipe Seamless Corrosion-resisting steel . . . 316L or 304L” (app. supp. R4, tabs 17A at 1, 4).

10. BIW selected and installed 304L CRES, type P-2, on DDG 90's FOFT piping external to the fuel tanks, of 6", 8" and 10" diameter and about 1/8" in wall thickness. BIW joined piping sections, elbows and tees using 308L CRES filler material for butt welds and fillet welds on bell-ended, sleeve and flange joints. BIW did not install any low point drains on the FOFT piping. (Ex. A-6; tr. 1/48-50, 124)

11. FOFT piping welds were required to be inspected visually in accordance with (a) MIL-STD-278F, dated 26 January 1987, which stated that P-2 piping joints "shall not be permitted on materials subject to crevice corrosion unless the inside surface of the weld is visually inspected to assure complete weld penetration" and required visual inspection and pressure (hydrostatic) tests for P-2 piping exceeding 2½" size, and (b) NAVSEA 0900-LP-003-8000, which required welds to be free of *cracks*, *incomplete fusion*, *burn-through* ("A void or open hole extending into . . . adjacent base metal") and *melt-through* ("A convex or concave irregularity on the surface of . . . fused root, or adjacent base metal resulting from fusion completely through a localized region but without development of a void or open hole") "provided that the areas [of melt-through and repaired burn-through] do not contain cracks, crevices, excessive oxidation, or globules, and provided the root convexity and concavity limits are not exceeded," or *oxidation* ("condition resulting from partial or complete lack of inert gas shielding of a surface which is heated during welding resulting in formation of oxide [scale] on the surface") manifesting "a wrinkled or crystalline surface appearance" except "tightly adhering, iridescent temper films [are] acceptable" (app. supp. R4, tab 307A at 2, 4, 6-7; tr. 1/220, 2/27-28, 3/24).

12. Specification §§ 505g1, 095-505 and 095-541 required a hydrostatic pressure test of piping systems "generally with . . . clean fresh water" at 1.5 times the component's design pressure "to check joint tightness and soundness of the pressure containing boundary," after the completion of which the system was required to be "drained thoroughly and blown out with air" (R4, tab 3 at 513, 546, tab 4 at 708; app. supp. R4, tab 83A at 10; tr. 1/220-21, 2/28). FOFT piping installed aboard DDG 90 was so inspected and successfully hydrostatically tested from 9 November 2000 to 17 September 2002. The record contains no evidence that any DDG 90 FOFT pipe or welds were found to be defective before 18 September 2002. (App. supp. R4, tab 100A at 1, 18-20)

13. Specification § 541f provided: "Fuel systems shall be flushed with JP-5 or F-76 fuel . . . upon completion of system installation and hydrostatic test" to remove foreign matter from the piping, and for the "Fuel fill system. – Fill a fuel tank with flushing fuel, utilizing all filling stations and fill piping during filling operation" (R4, tab 2 at 397).

14. BIW's first Departmental Operating Instruction (DOI) No. 10-014, dated 22 May 1996, was entitled "PROCEDURE FOR FLUSHING AND CLEANING THE

FUEL SYSTEM,” and provided that “[t]he flushing fluid shall be Diesel Fuel Marine (F-76) (MSDS #4397)” (§ 4.4) “utilizing all filling stations and fill piping during the final filling operation . . . upon fueling prior to sea trials” (§ 7.1) and “[a]ll piping shall receive a minimum flush velocity of 5 feet per second” (§ 6.1) (app. supp. R4, tab 30A at 2, 4-5). To assure flushing of all FOFT piping into each receiving tank, to avoid delaying “hot work” while cleaning fuel oil from the FOFT piping and tanks, and to reflect a BIW/SUPSHIP 15 May 1998 oral agreement, BIW revised DOI 10-014 by Rev. A, 27 August 1998, to provide in pertinent part:

5.10 Flushing Procedure for Fuel Filling System

5.10.1 The flushing requirements for the fill system shall be satisfied by flushing the piping with fresh water from each fill station to the fuel receiving tanks such that all deck stations . . . and receiving tanks have been utilized.

The revised DOI 10-014 deleted the procedure to flush the FOFT “during the final filling operation . . . upon fueling prior to sea trials.” (R4, tab 5; app. supp. R4, tabs 47A, 49A, 50A, 51A, 55A, 59A, 62A, 64A) The parties did not agree to the § 5.10.1 procedure in writing. SUPSHIP knew that it differed from specification § 541f. BIW used the § 5.10.1 procedure without SUPSHIP objection to flush the FOFT piping of DDGs 76, 77, 79 and 83 from 1998 to 2002 under several contracts. (App. supp. R4, tab 58A at C, E, H, tab 67A at 9, tab 69A, tab 154A at 2; tr. 1/130-31, 138-39, 211-12, 2/132, 3/64, 4/157-58, 170-71)

15. Thomas P. Gerrish, BIW’s supervisor of operating engineers, was responsible for the flushing of DDG 90’s FOFT piping after its hydrostatic testing (tr. 1/127). On 6 September 2002 Mr. Gerrish sent SUPSHIP a “release” scheduling DOI 10-014, step 5.10, flush and clean DDG 90 FOFT at 1000 hours on 9 September 2002 (app. supp. R4, tabs 58A(H), 96A, 308A at 16; tr. 1/140-41, 173). Mr. Gerrish saw no SUPSHIP personnel on site when he began the flush on 9 September 2002 (tr. 1/142, 174, 181-82). Mr. Gerrish connected a 2½" hose to a fuel oil filling station on DDG 90’s 02 deck, saw a small water velocity insufficient to move dust in the FOFT, reconnected the hose to a fire main charged with “tidal” Kennebec River water, and gave no prior notice to BIW hull test manager Steve Berry or any SUPSHIP personnel of that changed water source (app. supp. R4, tab 308A at 17; tr. 1/140-48, 171-75, 182, 188, 201). Analyses of the river water showed chloride from 97 to 6,500 parts per million (PPM) in September 2002 (R4, tab 17 at 910, 912, 922). On 9 September 2002, Mr. Gerrish did not have any idea that river or salt water could damage the stainless steel (*i.e.*, CRES) FOFT piping (tr. 1/143).

16. SUPSHIP's inspection records of DDG 90's FOFT flush reported acceptance on 10 September 2002 by SUPSHIP's Dominic Vella of inspection step "C": "contractor is in compliance of [sic] each paragraph/sub-paragraph of the process identified within Release." Those records do not state or prove that Mr. Vella personally observed the 9 September 2002 FOFT flush, or how he determined that BIW complied with the process in DOI 10-014, ¶ 5.10.1. (App. supp. R4, tab 291A at 7-8; supp. R4, tab 388 at 4; tr. 3/62, 5/146-47, 150) Mr. Vella did not testify at the hearing.

17. Shortly after the 9 September 2002 FOFT flush, Mr. Gerrish disconnected DDG 90 FOFT piping flanges, which allowed some standing water in the FOFT piping to drain into the bilge (tr. 1/132-33, 148-49). However, some Kennebec River water remained in the DDG 90 FOFT piping for about eight months (app. supp. R4, tab 190A at 1; tr. 1/77-78, 3/133, 158-59, 185, 190-91).

18. In April-May 2003, BIW discovered 73 holes in the DDG 90's FOFT piping, which permitted leaks (supp. R4, tab 38 at 2). Sixty-three holes were at or near heat-affected, circumferential butt welds and fillet welds joining pipe sections, belled end fittings and sleeves, mainly at the bottom ("six o'clock") sector of the piping. Ten holes were found on pipe walls. (App. supp. R4, tab 212A, Appendix F; tr. 1/225, 236-37, 2/41, 218)

19. BIW first notified SUPSHIP of the FOFT piping leaks on 12 May 2003 (supp. R4, tab 43; app. supp. R4, tabs 106A, 107A; tr. 1/83-84). As it does in all insurance claims, on 15 May 2003 BIW established a separate insurance account (later named Work Package No. INS896) in which it recorded Job Charge Nos. 4500, 1100, 7120, 1400, 1610, 2200, 8000, 6310 and 2600 for the actual labor and material costs attributable to DDG 90's FOFT piping investigation and repairs, and transferred thereto some engineering investigation costs incurred before that date (app. supp. R4, tab 282A; tr. 2/56-60). BIW's 23 May 2003 letter notified SUPSHIP of BIW's analysis and repairs of FOFT leakage (app. supp. R4, tab 138A).

20. To identify the causes of the DDG 90 FOFT piping failures and devise a plan to halt the corrosion and to repair the damaged FOFT piping, BIW retained as consultants Thielsch Engineering, Inc., Cranston, RI, on 14 May 2003; Dr. Daniel H. Pope of Bioindustrial Technologies, Inc., Bayfield, CO, on 15 May 2003; and Clean Harbors Environmental Service on 29 May 2003 (R4, tab 17 at 990-91, 1010-22, 922, 988).

21. Thielsch obtained DDG 90 specifications and FOFT failure data from BIW, and on 16 and 20 May 2003 inspected and took samples of DDG 90 FOFT pipe and the river water used for its flushing. Thielsch analyzed the metallurgical characteristics of the FOFT pipe samples by spectroscopy and microscopy and their material components by chemical analysis, and analyzed water and slurry deposit samples taken from such

pipng for their chemical and biological elements. (R4, tab 17 at 910-22) BIW sent Thielsch's 30 May 2003 report to SUPSHIP and to expert witnesses Susan Borenstein, Richard Hayes and Terry McNelley (see findings 31, 39(b), 41, 43).

22. Dr. Pope examined two FOFT piping samples and information received from BIW and Thielsch's 30 May 2003 report, and provided his views thereon to BIW on 23 June 2003 (R4, tab 17 at 944-45; app. supp. R4, tabs 123A at 4-5, 124A, 173A at 1).

23. Starting in mid-May 2003, BIW performed video-borescope and ultrasonic thickness gauge analyses of about 472 feet of FOFT piping to identify indications of pitting and corrosion (tr. 1/85-86). On 21 May 2003 Clean Harbors inspected DDG 90's FOFT and suggested procedures to BIW to clean, disinfect, dry and chemically treat the FOFT in order to prepare it for final repairs (app. supp. R4, tabs 121A, 131A).

24. In May-June 2003 BIW repaired nine corrosion sites; reduced the piping from 10" to 8" to facilitate replacement in Engine Rooms 1 and 2; removed and replaced 322 feet of piping; devised and implemented a "work-around" or "by-pass" plan, using jumper hoses and the 3" defueling main to divert fuel around areas of FOFT piping undergoing repair and replacement, so as not to delay the "Bravo" sea trials scheduled for late June 2003; hydrostatically tested the FOFT piping from 23 May to 6 June 2003 to confirm its soundness; and re-flushed the FOFT piping. (App. supp. R4, tabs 122A, 125A, 130A, 131A, 146A, 161A, 212A at 19-22, 27-29, App. M, 223A at 4-5, 232A, 290A, 323A; tr. 1/85-86, 224-33, 3/105-06, 126-29, 4/176-77) From 21 May to 30 July 2003 Clean Harbors water-blasted, vacuumed, bore-scoped and flushed DDG 90's FOFT piping, and disposed of water and materials containing hydrogen peroxide (supp. R4, tab 85 at 16-22, 40-46, 66-68, 87-88; tr. 1/88-89, 124-25).

25. SUPSHIP's Quality Deficiency Report (QDR) No. DDG-90-B-MS003-006 dated 9 June 2003 stated that on or about "09/06/02" (sic) BIW's substitution of "brackish river water" for "fresh water" specified by the contract to flush the DDG 90's FOFT piping "without government approval result[ed] in considerable damage to the piping components and a considerable cost of repair/replacement. The shipbuilder is requested to perform a root cause [sic] analysis on deviating from technical requirements" (R4, tab 14 at 872).

26. BIW's 27 June 2003 request No. RD03-02/INS96, for an estimated \$1,846,928 adjustment under the Insurance clause, stated that in May 2003 BIW had analyzed DDG 90 pipe samples to determine the cause of the corrosion and leaks, and related the views of Thielsch Engineering and Dr. Pope on causes of FOFT corrosion (R4, tab 16 at 900-02). On that same date, the CO directed BIW to proceed with DDG 90 FOFT repairs and replacement under the Insurance clause "without prejudice to any other rights of the Government" (app. supp. R4, tab 177A).

27. BIW's 15 July 2003 response to QDR No. DDG-90-B-MS003-006 stated:

An investigation has been done by interview of the responsible Supervisor, Tom Gerrish. Tom felt there was insufficient flow to accomplish the flush by use of the fresh water provided. He chose to use river water on his own, without approval. He felt it was reasonable as this piping can be, and sometimes is, exposed to straight sea/river water, and it is designed and fabricated with corrosion resistant steel.

(R4, tab 14 at 873)

28. On 16 July 2003 SUPSHIP found that the loss or damage to DDG 90 FOFT piping could not "have been caused by a defect in part in a contractor-furnished component, subassembly, system or equipment" (R4, tab 14 at 871). BIW's 1 August 2003 memorandum to SUPSHIP regarding request No. RD03-02/INS96 repeated its views regarding the causes of the corrosion damage incurred on the DDG 90 FOFT piping, cited 16 similar weld joint and piping failures in seven DDGs, and listed 10 insurance claims in which the SUPSHIP recognized Insurance clause coverage in instances of negligent workmanship (R4, tab 20 at 1057, 1059-64, 1099).

29. SUPSHIP's 14 August 2003 letter to BIW asserted that the DDG 90 FOFT piping damage came within the exception to the Insurance clause, because the cause was not negligent workmanship, but rather was a "willful" and "deliberate" deviation from the fresh water flushing procedure prescribed in DOI No. 10-014 (R4, tab 21 at 115-16).

30. BIW delivered DDG 90 to the Navy in August 2003 (tr. 2/64).

31. BIW sent to SUPSHIP a 5 September 2003 "Final Report: DDG90 – USS CHAFEE Fuel Oil Fill and Transfer Piping Microbiologically Influenced Corrosion (MIC), Crevice Corrosion and its Treatment," that appended FOFT failure data for DDG 51 class vessels; visual and borescope inspection logs; ultrasonic, metallographic and radiographic test data for DDG 90's FOFT piping; BIW's procedures to identify, repair and replace failed DDG 90 FOFT piping; and Thielsch Engineering's views regarding the causes of the FOFT piping holes and leakage (app. supp. R4, tab 212A at 1, 7, 10-12).

32. BIW's 19 November 2003 letter to SUPSHIP submitted a certified claim for \$1,341,129 to repair and replace an estimated 322 feet of DDG 90's FOFT piping (R4, tab 22). BIW's post-delivery work on DDG 90's FOFT included testing and verifying DDG 90's FOFT repairs, analyzing the flush procedures, and claim preparation

(supp. R4, tabs 320-26, 328-45, 347-56, 359-62; app. supp. R4, tabs 204A-221A; tr. 2/64-65).

33. The CO's 16 January 2004 final decision denied BIW's 19 November 2003 claim on the bases of the unauthorized decision of "the BIW supervisor" to deviate from the specified fresh water flush requirement and of BIW's analysis concluding that piping "leaks were due to corrosion caused by high levels of chloride and microbiologic organisms in the river water." The CO said that failure to use fresh water was a knowing deviation from DOI requirements and BIW's argument about the SUPSHIP's prior "course of conduct" was mistaken. (R4, tab 24) On 26 March 2004 BIW timely appealed the CO's foregoing final decision to this Board, which docketed the appeal as ASBCA No. 54544.

34. On 27 October 2004 BIW revised its DDG 90 FOFT piping claim to \$1,261,225, based on actual (instead of estimated) labor hours, material costs in "MCZ 430 BR dated October Month End," burden rates in "Forward Pricing Rate Agreement MOA 2004-D-411-004-00," and legal fees through 19 November 2003, and included BIW's costs to develop and implement the June 2003 "work-around" solution to enable DDG 90 to go on the Bravo trial (app. supp. R4, tab 212 at App. V, tab 306A; tr. 2/58-66).

35. The costs in BIW's \$1,261,225 claim revision were: (a) \$785,192 for 16,893 labor hours charged to Work Package No. INS896, including 2,242 engineering hours at \$59.13/hr., 244 designer hours at \$43.33/hr., 9 advanced technology hours at \$75.38/hr., 13 life cycle support hours at \$49.22/hr., 44 G&A hours at \$28.64/hr., 2,554 support hours at \$49.90/hr., and 11,787 production hours at \$43.44/hr. BIW attached reports LR747 and LR252, which itemized the total hours each employee recorded by name, badge number, home department, and number of hours charged to INS896 (app. supp. R4, tab 306A at 4, 6, 8-11, 13-40); (b) \$388,966 for material costs, including subcontractors, "other costs" and "other material." Subcontractor costs of \$207,496 were taken from Job Charge No. 2201-5496 (a subcharge of 2200) in Material Cost Report No. MCZ430BR, listing subcontractors by purchase order number, name, material description and price.¹ Of Clean Harbors' \$172,364.94 price, \$50,492.66 was for flushing the FOFT from 1-7 June 2003 (supp. R4, tab 85 at 40-46). "Other costs" of \$30,383 included 16 material items by purchase order number, description (*e.g.*, pipe fitting, pipe flanges) and cost (supp. R4, tab 371 at 38-84). BIW paid \$279.80 for hydrogen peroxide (20 gallons at \$13.99/gal.) (supp. R4, tab 189 at 19-22). "Other material" costs of \$151,087 included support and IT material costs of \$84,604 that BIW derived by applying the standard rates

¹ BIW's claimed material costs did not include Job Charge No. 2185-2600, which allocated costs to DDGs 90, 92 and 94 (R4, tab 22 at 1128).

in BIW-SUPSHIP Memoranda of Agreement Nos. 04-D-412-247-00 and 04-D-412-175-00 to the part of the 16,893 labor hours recorded for each labor category, respectively, and legal fees of \$66,483, of which \$13,776.80 were documented by Smith Pachter invoices from 17 June to 13 November 2003 for conferences, legal research, document review and preparation of the Insurance clause claim for FOFT piping damage (supp. R4, tab 370; app. supp. R4, tab 306A at 4-7, 12; R4, tab 22 at 1128-29). We find no evidence that before 5 September 2003 BIW had adopted and maintained a litigation stance for the DDG 90 FOFT piping claim; (c) \$117,416 for fee at 10%; (d) \$19,651 for Facilities Capital Cost subtotaling \$1,311,225; and (e) less the \$50,000 Insurance clause deductible (app. supp. R4, tab 306A at 4, 6). In May-July 2003 the construction of DDG 90 was nearly complete, and sea trials were pending. The spaces in which BIW performed the investigation, remediation, repair and replacement of FOFT piping were cramped and confined, and those efforts were very difficult and time consuming. Numerous BIW engineering and production employees were reassigned from other shipyard work to work “round the clock” and on weekends to complete the DDG 90 FOFT repairs and replacement before the ship went on its scheduled sea trial. (Tr. 1/228-29) Considering the foregoing facts, we find that the 16,893 hours and associated labor charges, and the \$388,966 material costs, BIW recorded for the FOFT work were reasonable, subject to our finding on documented legal fees and our exclusion of the cost of re-performing the FOFT flush after the repair and replacement work was completed.

36. According to James P. O’Hare, BIW’s Director of Contracts and Estimating, BIW’s revised claim includes no delay or disruption costs (tr. 2/61). According to Edward Cummings, SUPSHIP’s Engineering Technical Director (tr. 2/128), who reviewed BIW’s insurance claim on 16 July 2003, there was no “delay, disruption or other impact on the [DDG 90] vessel . . . resulting from the [FOFT piping corrosion] damage” (R4, tab 14 at 870). Based on the foregoing evidence, the Board finds that BIW’s revised DDG 90 FOFT piping damage claim included no costs for delay or disruption, and its June 2003 “work-around” avoided delay and disruption of DDG 90 performance.

37. BIW’s claimed 2,242 engineering hours included 232.5 hours charged to BIW Department 1510 by T. P. Gerish -- 14.6 hrs., D. E. Arsenault -- 34.9 hrs., D. A. Bailey -- 136.6 hrs., S. B. Colfer -- 38.8 hrs. and J. R. Fournier -- 8.0 hrs. (app. supp. R4, tab 306A at 14, 24-25, 30-31). Those 232.5 hours at the \$59.13 engineering hourly rate equated to \$13,747.73, which we find included the re-flushing of the DDG 90 FOFT piping in 2003 (tr. 1/127, 2/66).

38. BIW included the costs to repair and to replace damaged DDG 90 FOFT piping in its progress payments of actual, allowable costs under the contract (tr. 2/68-69). If BIW were to prevail in this insurance claim, the parties will modify the contract to treat such costs outside of the contract’s incentive pricing provisions (tr. 2/73-76).

Expert Testimony on Corrosion Damage

39. Based on her 30 years of experience in, and professional publications regarding, corrosion engineering and MIC failures in welding types 304L and 316L stainless steel (ex. A-11 at 16-21), the Board accepted Ms. Susan W. Borenstein as appellant's expert in corrosion of stainless steel piping systems (tr. 2/120).

Ms. Borenstein: (a) has examined and analyzed CRES types 304L and 316L piping on nuclear and fossil fuel power plants, gas transfer systems, refineries and silicon chip facilities, some of which piping had corrosion and silt or sediment in them (tr. 2/123-25); (b) reviewed BIW's 5 September 2003 report, Thielsch Engineering, Inc.'s 20 May 2003 report and other documents (ex. A-11 at 8-12); and (c) inspected pipe sections removed from DDG 90 (ex. A-11 at 12), but performed no tests on them, nor did she analyze or test any Kennebec River water (tr. 2/121-22).

40. Ms. Borenstein testified that many bacteria produce organic and inorganic acids that dissolve the surface oxides and accelerate the corrosion rate of stainless steel; and iron-oxidizing bacteria form ferric iron that attracts chloride ions and produces ferric chloride, which aggressively attacks austenitic stainless steel (ex. A-11 at 6-7). She opined that that the corrosion of the welded stainless steel FOFT piping on a DDG Class ship was the product of a number of causes or events working together, including material selection, specified welding processes, the presence of large crevices in the welded belled end fittings and sleeves, the system design and arrangement, and its exposure to stagnant river water over a period of eight months. Of these causes, first in importance was the design with crevices in the belled end fittings and sleeves; second was the eight month period of stagnant water in the piping; and third was the use of brackish (*i.e.*, somewhat salty; tr. 2/67-68) river water in the 9 September 2002 flush, which accelerated the onset and severity of the corrosion. Corrosion at or adjacent to stainless steel welds exposed to fresh water remaining in a stagnant condition is not unusual. (Ex. A-11 at 9-14)

41. Based on his 21 years as a materials engineer experienced in testing, failure analysis and evaluation of corrosion on naval alloys (supp. R4, tab 374 at 6), the Board accepted Mr. Richard A. Hays as respondent's expert in corrosion of naval materials (tr. 4/207). Mr. Hays himself did not evaluate or perform tests on any metal from DDG 90's FOFT (tr. 4/200), but he reviewed, *inter alia*, many photos of DDG 90 FOFT piping and weld metal, the Thielsch Engineering report, BIW/Clean Harbor's borescope data, and Kennebec River water data (tr. 4/199-204, 237, 5/5-6, 10; supp. R4, tab 384).

42. Mr. Hays opined that: (a) the DDG 90 FOFT pipe's "localized corrosion, or pitting . . . resulted from extended exposure to stagnant water containing chlorides . . . a well-known failure mechanism for stainless steels"; (b) in water containing chlorides, the

chloride ions disrupt the chromium oxide passive film; (c) in stagnant water transport of oxygen ions to the metal surface is limited and available oxygen is consumed in the aspiration of biological organisms; (d) silt deposits or biological matter on the metal surface limits available oxygen; (e) biological material in seawater and brackish water includes “slimes” or “biofilms” of live or dead microbes that increase the corrosion rate, and “iron-oxidizing bacteria” relate to MIC and stimulate pitting or cause the formation of deposits that concentrate in welds; (f) chloride corrosion concentrated around the DDG 90 FOFT piping welds because welding heat causes chromium to be “not free to assist in passive film formation” and (g) weld defects act as crevices that “become preferential sites for corrosion initiation” (supp. R4, tab 374 at 2-5; tr. 4/223, 5/14, 16-17, 23, 25-26).

43. Based on his 33 years of academic experience and research in mechanical engineering, material science, failure analysis, welding metallurgy and microstructure, and numerous scientific publications in these fields, including the mechanical behavior of steel alloys (supp. R4, Tab 375 at 3-13), the Board accepted Dr. Terry R. McNelley as respondent’s expert in metallurgy, mechanical behavior of materials and failure analysis (tr. 4/53). Dr. McNelley received samples of DDG 90 FOFT piping and BIW’s 5 September 2003 final report (see finding 31) sent by SUPSHIP in October 2003; gave piping samples to three of his Naval Postgraduate School students for sectioning, grinding, polishing, etching and metallographic and failure analyses; sent other FOFT pipe and weld filler specimens to Anamet Laboratories, Hayward, CA, in December 2003 for chemical analysis; examined and analyzed the DDG 90 FOFT piping samples in March or April 2004; and prepared a report thereon for SUPSHIP in September 2004 (supp. R4, tab 375 at 13 of 13; tr. 4/42-43, 45, 48-52, 71).

44. Dr. McNelley opined that: (a) use of belled end fittings per se would not cause corrosion, since in a DDG 90 FOFT piping sample he examined, the corrosion appeared to initiate on the interior surface of a circumferential weld bead, spread through the weld metal, and could eventually encounter a crevice in a belled end fitting; (b) piping corrosion occurred “because of the chlorides and sediment in the River water and would have occurred regardless of the presence of microbes”; (c) “had iron eating or sulfide bacteria been present the corrosion due to the chlorides might have occurred at a faster rate, but without the chlorides those microbes would not have caused the observed corrosion”; (d) the chemical analysis of the DDG 90 FOFT piping samples indicated that “the pipe material conformed to the specification for the type 304L stainless steel and . . . the weld deposit composition was consistent with the use of type 308L stainless steel filler wire; these results are in agreement with the specifications for this system”; and (e) the “pitting failure was due to prolonged exposure to a corrosive environment not anticipated in the design and construction of the vessel” (supp. R4, tab 375 at 1-2, 1 of 13).

45. Based on the foregoing findings, we further find that when the chromium oxide film on the surface of stainless steel types 304L for FOFT piping and 308L for FOFT welding was damaged, such surface was susceptible to pitting and crevice corrosion; BIW's DDG 90 FOFT arrangement, use of its land level transfer facility instead of an inclined way, and advancement of FOFT piping installation and flushing in the DDG 90 construction sequence led to its prolonged exposure to stagnant, brackish, Kennebec River water and sediment, and probable acceleration by MIC; and the convergence of the foregoing factors caused the unforeseen, increased incidence of corrosion in DDG 90's piping, compared with earlier DDGs constructed by BIW (see findings 5, 8, 10, 14, 18, 28, 40, 42, 44).

46. We make no further ultimate findings with respect to FOFT material selection and crevices in bell-ended fittings since the experts disagreed whether these factors caused DDG 90's FOFT piping corrosion and such further findings are not necessary for the determination of liability under the Insurance clause (see findings 40, 42, 44).

Expert Testimony on Commercial Marine and Navy All Risks Insurance Clauses

47. Based upon his 45 years of experience in the field of commercial marine builders risk insurance as broker, Senior Vice President and Chairman of the National Maritime Committee of Johnson & Higgins Marine Brokers, as CEO of the New York office of Jardine Insurance Brokers, and as President of Marine, North America, of Willis Coroon, all in New York City, the Board accepted Mr. Daniel J. Donahue as appellant's expert in marine builders risk insurance, to which the contract's Insurance clause refers (tr. 2/108-09, 112). Mr. Donahue has no personal experience with the NAVSEA Insurance clause (ex. A-12, Attachment A; tr. 2/110-13). Mr. Donahue stated that commercial marine builders risk insurance does not contain a provision to exclude non-conforming work from its coverage, as in the NAVSEA Insurance clause (tr. 2/114). Under commercial marine builders risk practice, however, underwriters do not pay claims for correcting workmanship deficiencies, as opposed to repair of loss or damage resulting from such deficiencies (ex. A-12 at 11). Mr. Donahue opined that "once the vessel components are completed and installed" and "not defective," their "workmanship" has been completed, and damage incurred thereafter on such components does not arise from "defective workmanship" (ex. A-12 at 2-3, 14). Rather, the damage was caused at most by lack of judgment in using the wrong medium to flush the completed system. Mr. Donahue analogized this to a worker allowing valves to be left open, resulting in a flood. (Ex. A-12 at 3) He opined that the DDG 90 FOFT piping damage was not within the workmanship exception in the Insurance clause (ex. A-12 at 12-13).

48. Based on his 24½ years experience as insurance claims manager for TransAmerica Insurance Group and American Surety Co., and 18 years as a Navy insurance examiner, the Board accepted Mr. George Enter as respondent's expert in the

operation and administration of the Insurance clause in the DDG 90 and predecessors (tr. 5/30, 35). With respect to the NAVSEA Insurance clause, Mr. Enter opined that: (a) if a shipbuilder builds something incorrectly, the government does not pay to repair or replace the defective or nonconforming item itself, but if that defective work causes, for example, a fire or flood on the vessel, the shipbuilder's costs to repair or replace the work damaged by the fire or flood are recoverable (tr. 5/62, 67, 69) and (b) to recover for a casualty loss or damage, the cause must not be a "foreseeable and controllable process" but rather an event that "happens by chance outside the range of probability and is unintentional" (tr. 5/72-73). Mr. Enter also opined that "if the contractor incurred costs to work around while it corrected any deficiencies in a vessel or ship, those work around costs would not be recoverable" because the government does not pay for delay and disruption, and the DDG 90 FOFT piping damage was within the defective or non-compliant workmanship exception in the Insurance clause (tr. 5/73-74; supp. R4, tab 373 at 1-2).

Course of Dealing of the Parties on the NAVSEA Insurance Clause

49. The Navy allowed recovery of BIW's costs to investigate, repair or replace damaged items under a NAVSEA Insurance clause identical to that in the DDG 90 contract (Board ex. 1), notwithstanding violations in some cases of contract specifications or BIW DOIs, and the issuance of QDRs in some of the following instances of loss of or damage to other DDGs under construction at BIW: (a) in 1992 a "relatively large piece of steel" of unknown source was found in the inlet of No. 2A lube oil pump on DDG 53 which caused "major internal damage" and required replacement of the pump (app. supp. R4, tab 29A(B) at 2); (b) in 1993 a weather deck fan room door on DDG 53 was left open causing a cooling fan coil to freeze and burst, which resulted in water leakage and required replacement of the coil (app. supp. R4, tab 29A(E) at 3, 6); (c) in 1993 foreign materials blew from Halon piping nozzles, discolored the paint in surrounding areas of three spaces aboard DDG 53 and required their re-painting (app. supp. R4, tab 29A(G) at 3); (d) in 1993 welding and grinding splatter scratched and damaged 21 pilot house windows aboard DDG 53 and required replacement of the windows (app. supp. R4, tab 29A(H) at 3); (e) in 1995 a winter freeze ruptured a fan coil on DDG 64, caused leakage and required replacement of the fan coil (app. supp. R4, tab 29A(M) at 3); (f) in 1995 a water hose on an unsecured manifold ruptured during the July 4th weekend, flooded 12 compartments aboard DDG 68, and required water removal and clean up (app. supp. R4, tab 29A(N) at 4); (g) in 1997 a 6½" by 2½" by ¼" aluminum plate lodged against the inlet vanes of the main gas turbine engine on DDG 70 and caused high cycle fatigue failure of the blades for which SUPSHIP issued a QDR, and which required engine repair (app. supp. R4, tab 29A(O) at 1-6); and (h) in 2000 an unidentified foreign object nicked and dented three compressor blades of generator No. 1 aboard DDG 83, which required replacement of the damaged engine (app. supp. R4, tab 29A(S) at 2-3).

50. BIW withdrew its claims under a NAVSEA Insurance clause identical to that in the DDG 90 contract (Board ex. 1) in three instances of other DDGs under construction at BIW: (a) in 1992 BIW's improper flushing of the lube oil system allowed sand blast grit to enter and contaminate the piping on DDG 53, which required disassembly, borescoping, vacuuming, washing, re-flushing and re-assembly of the system (app. supp. R4, tab 29A(C) at 1, 4-5); (b) in 1994 a "lack of weld fusion due to poor workmanship" caused a fuel pipe leak on DDG 56 and required removal of insulation and adjacent equipment, pumping, cleaning, re-welding and re-painting the pipe (app. supp. R4, tab 29A(I) at 1-3); and (c) in 1994 tank epoxy was improperly mixed and failed to cure during low temperatures on a potable water tank aboard DDG 62, requiring removal and replacement of the epoxy (app. supp. R4, tab 29A(K) at 1-4).

51. SUPSHIP denied BIW's claims under a NAVSEA Insurance clause identical to that in the DDG 90 contract (Board ex. 1) in: (a) 1994 arising from damage to the sonar cabinets' heat exchanger under a contract for guided missile cruiser CG-64, due to BIW's defective workmanship based on its non-compliance with a specification and BIW's inspection procedure to protect the equipment during construction (supp. R4, tab 25; tr. 3/129-30), and (b) 1996 for replacing two lower rudder bearing housings for DDG 76 which BIW improperly had "machined upside down" and "damaged beyond repair" (supp. R4, tab 30 at 1-2).

DECISION

I.

Appellant argues: (1) The July 1997 Insurance clause in the DDG 90 contract "incorporated" the Navy's 1942 "all risks" insurance policy covering all fortuitous events causing vessel damage during construction (app. br. at 37-40). (2) The DDG 90 piping casualty was a fortuitous event resulting from a combination of causes that could not reasonably have been known or foreseen in advance (*id.* at 40-47). (3) The defective or noncompliant workmanship exception in the Insurance clause is inapplicable to a fortuitous casualty, consistent with the FAR 31.205-19(e)(3) cost principle and the parties' past practices of Insurance clause claim administration (*id.* at 43-45, 48-68). (4) BIW's non-compliance with DOI 10-014 does not defeat its right to recover (*id.* at 68-70). (5) According to "all risks insurance" precedents, if a casualty results from a number of causes, only one of which is an excluded risk, the casualty is covered (*id.* at 70). (6) The FOFT piping casualty resulted in part from the defective design of, or latent defects in, the DDG 90 (*id.* at 71-72). (7) If ambiguous, the Insurance clause defective workmanship proviso must be construed against the Navy (*id.* at 72-73). (8) BIW established the amount of damages to repair the FOFT piping (*id.* at 73-74).

Respondent argues: (A) The Insurance clause expressly excludes coverage of defective and non-conforming workmanship on the FOFT piping itself, namely, BIW's use of river water for the FOFT flush which was deliberate and intentional and not fortuitous or dependent upon chance (gov't br. at 32-37). (B) The government is entitled to strict compliance with the specification that required fuel oil to flush the FOFT after its hydrostatic test (*id.* at 37-38). (C) BIW failed to prove any costs properly attributable to performance which were not its own fault (*id.* at 38-42).

II.

Appellant has the burden of proving its affirmative, monetary claim against the government. *See John T. Jones Construction Co.*, ASBCA Nos. 48303, 48593, 98-2 BCA ¶ 29,892 at 147,974, *aff'd*, 178 F.3d 1307 (Fed. Cir. 1998) (table).

In 1980 NAVSEA modified the original Insurance clause to except the costs “for the inspection, repair, replacement, or renewal of any defects *themselves* in the vessel(s) . . . due to . . . defective workmanship” (emphasis added). NAVSEA added that word “themselves” to bar recovery of the costs to re-do defective work itself, but not to bar recovery of the costs of fortuitous casualties resulting from such work. Pub. L. No. 97-12, enacted 5 June 1981, reflected the foregoing Navy actions and barred paying “for correction of the contractor's own defects in materials or workmanship incident to the normal course of construction (. . . which do not constitute a fortuitous or casualty loss).” (Finding 4)²

In the DDG 90 contract the Insurance clause's workmanship exception included the words “defects themselves” (finding 2). Therefore, we must decide the extent to which BIW's investigation, repair and replacement of the damaged FOFT piping in 2003 (findings 19-24) required it to correct the “defects themselves” (which would be within the workmanship exception), or required it to investigate, repair or replace materials damaged by “fortuitous or casualty losses” (finding 4) (which would not be within that exception).

Black's Law Dictionary, 6th Ed. (1990), includes the following definitions:

² The DAR 15-205.16(a)(3) Insurance and Indemnification cost principle added in February 1983 implemented Pub. L. No. 97-12 and further explained the phrase “defects themselves”: “The cost of insurance to protect the contractor against the costs of correcting its own defects in materials or workmanship is unallowable. However, insurance costs to cover fortuitous or casualty losses resulting from defects in materials or workmanship are allowable as a normal business expense.” The identical cost principle was in FAR 31.205-19(a)(4) in March 1998.

Fortuitous event. An event happening by chance or accident. That which happens by a cause which cannot be resisted. An unforeseen occurrence, not caused by either of the parties, nor such as they could prevent. For purposes of an all risk insurance policy, an event which occurs accidentally, as a lay-person, and not a technician or scientist, would understand that term. It is an event which happens by chance, unexpectedly, or without known cause; one which is undesigned or unplanned.

....

Casualty. . . . A disastrous occurrence due to sudden, unexpected or unusual cause. Accident; misfortune or mishap; that which comes by chance and without design. A loss from such an event or cause; as by fire, shipwreck, lightning, etc. *Standard Structural Steel Co. v. Bethlehem Steel Corp.*, [597 F. Supp. 164, 193 (D. Conn. 1984).]

To explain the distinction between correcting “defects themselves” and repairing or replacing work damaged by a casualty loss, Mr. Enter testified that the government does not pay to repair or replace defective work itself, but if such defective work causes a fire or flood on a vessel, the government does pay the costs to replace or repair the fire or flood damage (finding 48(a)).

The “defects themselves” in this dispute were Mr. Gerrish’s post-hydrostatic test flush of DDG 90’s FOFT piping by Kennebec River water on 9 September 2002 (finding 15). We reject Mr. Donahue’s view that damage incurred after DDG 90’s FOFT piping was installed without defect does not arise from “defective workmanship” because the contract required a post-hydrostatic test flush of the FOFT piping (finding 13), and such flush unquestionably required “workmanship.” To the extent that BIW’s claim includes its re-performance of the post-hydrostatic test flush with rinse water containing hydrogen peroxide (findings 24, 35(b)), such damage or loss is within the Insurance clause’s “defects themselves” exception to government liability.

The other damage or loss BIW repaired and replaced in May-June 2003 was the DDG 90 FOFT piping corroded by the convergence of BIW’s DDG 90 FOFT arrangement, use of its land level transfer facility instead of an inclined way, and acceleration of FOFT piping installation and flushing in the DDG 90 construction sequence, leading to its prolonged exposure to stagnant, brackish, Kennebec River water (finding 45). The unforeseen, increased incidence of corrosion in DDG 90’s FOFT

pipng, compared with earlier DDGs constructed by BIW, was a “fortuitous or casualty loss” under the terms of the Insurance clause, as illuminated by the legislative history of Pub. L. No. 97-12 (finding 4). The DDG 90’s FOFT piping damage or loss occurred “accidentally,” as a lay-person would understand that term, not as an expert in corrosion of 304L and 308L stainless steel pipe and weld materials in the presence of water containing chlorides would understand that term. Mr. Gerrish no doubt intended on 9 September 2002 to substitute Kennebec River for the required fresh water flush of DDG 90’s FOFT piping. But he did not have any idea that salty river water would damage the FOFT piping (finding 15). It is a fair inference that on 9 September 2002 Mr. Gerrish did not design or plan the corrosion damage to DDG 90’s FOFT piping that BIW found seven months later.

Furthermore, the parties’ course of dealing under the Insurance clause in previous DDG and CG contracts from 1992 to 2000 shows a pattern of allowing recovery for loss or damage resulting from defective work or negligent actions of, and non-performance of contract requirements by, BIW employees (finding 49), and of claim withdrawal or SUPSHIP disallowing claims for repairing or redoing the defective work itself (findings 50-51).

The parties cite, and our research has found, only two decisions interpreting NAVSEA’s shipbuilding Insurance clause. Neither is controlling in deciding this appeal. In *General Dynamics Corp., Quincy Shipbuilding Division*, ASBCA Nos. 16330 *et al.*, 73-1 BCA ¶ 9770, and *Northwest Marine Iron Works, Inc.* ASBCA No. 16350, 73-1 BCA ¶ 9902, the Insurance clauses were of 1966 and 1969 vintages, respectively, and neither contained the defective workmanship exception in the DDG 90 contract’s clause. In *General Dynamics* the only issue was whether disruption costs were recoverable under an Insurance clause that did not expressly exclude disruption costs. In *Northwest Marine*, the only issue was whether the casualty loss was recoverable under the contractor’s Ship Repairer’s Legal Liability policy under ¶ (a)(ii) of the Insurance clause.

Jacksonville Shipyards, Inc., ASBCA No. 45789, 95-1 BCA ¶ 27,332, *aff’d*, 73 F.3d 380 (Fed. Cir. 1995) (table), denied recovery of the contractor’s costs to repair a hydrofoil strut under the Liability and Insurance clause in that boat repair contract. The clause contained essentially the same defective workmanship exception with the phrase “defects themselves,” as appears in the DDG 90 Insurance clause. The contractor’s machinists reinstalled the aft port hydrofoil strut’s drain plugs before applying steam, a sequence contrary to the unambiguous contract requirements. While steam cleaning the strut, they observed protrusion or wrinkling caused by over pressurization. 95-1 BCA at 136,224-25. We held that the strut “deformation was a defect in the vessel . . . caused by defective workmanship” and was not compensable under the Liability and Insurance clause. *Id.* at 136,227. *Jacksonville* is distinguishable from the instant appeal, because the defective workmanship (improper reinsertion of the plugs) was the single cause of the

deformation of the hydrofoil strut, which damage was immediately and visually obvious to the contractor's workmen. In the case at bar, the nonconforming Kennebec River water flush of DDG 90's FOFT was not the single cause of the piping corrosion. DDG 90's FOFT corrosion resulted from BIW's first use of its land level transfer facility, BIW's FOFT configuration, the accelerated sequencing of the FOFT pipe installation and flushing, and the nonconforming flush water (finding 45). Moreover, the improper Kennebec River water flush was not necessarily the cause in fact or the proximate cause of the corrosion, since such corrosion could as well have occurred from a fresh water flush (finding 40). Finally, the FOFT corrosion was not immediately obvious to BIW but instead went undetected for more than seven months, and was fortuitous, in the sense of unforeseeable, unplanned and unintended.

Furthermore, there is merit to appellant's argument that, in all risks insurance law, if a casualty results from a number of causes, only one of which is an excluded risk (*e.g.*, defective workmanship), there is coverage. *See General American Transportation Corp. v. Sun Insurance Office, Ltd.*, 369 F.2d 906, 908 (6th Cir. 1966) (where a policy expressly insures against direct loss and damage by one element, but excludes loss or damage caused by another element, the coverage extends to the loss even though the excluded element is a contributory cause).

Respondent argues that it was entitled to strict compliance with the specification § 541f requirement for a fuel flush of DDG 90's FOFT piping (finding 13). Respondent was not entitled to such compliance, because it knew that the DOI No. 10-014, ¶ 5.10.1, fresh water flush differed from the specification § 541f fuel flush, and BIW used the ¶ 5.10.1 fresh water FOFT flush without SUPSHIP objection on DDGs 75, 77, 79, 83, and 90 from 1998 to 2002 under several contracts (finding 14).

We hold that BIW's investigation, repairs and replacement of DDG 90's corroded FOFT piping were not within the defective workmanship exception to the Insurance clause.

III.

The ascertainment of damages is not an exact science, and where responsibility for damage is clear, it is not essential that the amount thereof be ascertainable with absolute exactness or mathematical precision: "It is enough if the evidence adduced is sufficient to enable a court or jury to make a fair and reasonable approximation." *Bluebonnet Savings Bank, F.S.B. v. United States*, 266 F.3d 1348, 1355 (Fed. Cir. 2001). "If a reasonable probability of damage can be clearly established, uncertainty as to the amount will not preclude recovery," and the court's duty is to "make a fair and reasonable approximation of the damages." *Ace-Federal Reporters, Inc. v. Barram*, 226 F.3d 1329, 1333 (Fed. Cir. 2000).

BIW adduced labor and material cost reports, subcontractor and vendor purchase receipts and standard rate data to support its \$1,261,225 revised claim (finding 35). Respondent contends that BIW's summaries and cost listings are not proof without substantiation from BIW's accounting records and work papers and there is no evidence that such costs were realistic and reasonable, its "work-around" costs are disruption costs that are not recoverable under the Insurance clause, and it cannot recover costs incurred after 14 August 2003 when SUPSHIP advised BIW that the claim came within the Insurance clause's workmanship exception (gov't br. at 31, 39, 41).

BIW's labor and material cost reports, subcontractor and vendor purchase receipts and standard rate data were documents regularly prepared for all insurance clause claims, *i.e.*, in the normal course of BIW's Navy shipbuilding business, to accumulate its costs attributable to this DDG 90 insurance claim, were supported by foundation testimony of a BIW witness with first hand knowledge of BIW's record-keeping procedures, and showed BIW's actual payments for the FOFT piping investigation, repair and replacement work (findings 19). Those records are acceptable evidence of BIW's damages. *See Ace-Federal, supra*, 226 F.3d at 1356-57 (when a "Memo Account" regularly prepared in the normal course of business showed the amounts owed by the adverse parties, its rejection by the trial court, because a witness was unable to fully explain the basis for all the costs set out in it, was "clear error" because the proponent was not required to justify the basis for each term in the agreement); *Air Land Forwarders, Inc. v. United States*, 172 F.3d 1338, 1342, 1344 (Fed. Cir. 1999) (repair estimates kept in the course of a regularly conducted business activity with a regular practice of creating such records are admissible under the FRE Rule 803(6) exception to the hearsay rule, even though activity did not produce witness with first hand knowledge of the procedures used in the original preparation of each repair estimate); *Commercial Energies, Inc.*, ASBCA No. 50316, 98-1 BCA ¶ 29,549 at 146,478, *aff'd*, 194 F.3d 1330 (Fed. Cir. 1999) (table), *cert. den.* 528 U.S. 820 (1999) (in the absence of documented payments by contractor, Board accepted "reconstructed" charges derived from federal regulatory tariffs). This standard for proof of damages was not shown in the authorities respondent cites: *Pathman Construction Co. v. United States*, 227 Ct. Cl. 670, 676 (1981) (claim letters and uncorroborated hearsay); *Tagarelli Brothers Construction Co.*, ASBCA No. 34798, 88-1 BCA ¶ 20,363 at 102,989 (testimony not substantiated by any accounting records and refuted in part by government evidence).

As to respondent's second argument, appellant has the burden to establish that its actual costs paid were reasonable. *See FAR 31.201-3(a)*. We found above that appellant has carried that burden (finding 35). As to respondent's disruption argument, we found that, based on the consistent testimony of the parties' witnesses, BIW's FOFT claim included no delay or disruption costs, and specifically that its June 2003 "work-around" efforts avoided delay and disruption of DDG 90 performance (finding 36).

Respondent challenges BIW's costs of testing and verifying DDG 90's FOFT repairs, analyzing the flush procedures, claim preparation, and attorney fees incurred after 14 August 2003 up to 19 November 2003, when BIW certified its claim (finding 32). We hold that \$13,776.80 of BIW's attorney fees incurred to research and prepare its Insurance clause claim up to 5 September 2003 (finding 31), before which date it had not adopted and maintained a litigation stance (finding 35(b)), are recoverable costs of contract administration. *See Grumman Aerospace Corp.*, ASBCA No. 50090, 01-1 BCA ¶ 31,316 at 154,674-76 (one must determine the objective reason for which legal, accounting and consultant costs are incurred before or after the filing of a CDA claim, to wit, to further the negotiation process or to promote the prosecution of the claim; Board denied costs because the subcontractor never backed away from its initial litigation stance).

It remains to determine the extent to which BIW's accumulated DDG 90 FOFT piping costs pertained to the "defects themselves," *viz.*, re-performance of the post-hydrostatic test flush with rinse water containing hydrogen peroxide. BIW's reflushing costs are comprised of engineering costs of \$13,747.73 (finding 37) and material costs of \$50,492.66 billed by Clean Harbors for the FOFT flushing performed from 1-7 June 2003 and \$279.80 for hydrogen peroxide (finding 35(b)), totaling \$64,520.19. BIW did not document \$52,706.20 in attorney fees (\$66,483 - \$13,776.80).

To those amounts, totaling \$117,226.39, we add BIW's 10% fee of \$11,722.64 and FCC cost of \$1,961.92 ($\$117,226.39 \times .0167362$), for a total of \$130,910.95. We reduce BIW's revised claim total of \$1,311,225 (finding 35(d)) by \$130,910.95 to \$1,180,314.05 and subtract therefrom the \$50,000 Insurance clause deductible, leaving a balance of \$1,130,314.05 for the costs and fee to investigate, repair and replace DDG 90's corroded FOFT piping.

We sustain the appeal to the extent of \$1,130,314.05 to be treated in accordance with the parties' representations (*see* finding 38), and deny the balance of the appeal. BIW is not entitled to recover Contract Disputes Act interest thereon, since interest runs until payment and respondent already has paid those costs in the course of BIW's progress payments under the contract (41 U.S.C. § 611; finding 38).

Dated: 22 December 2005

DAVID W. JAMES, JR.
Administrative Judge

Armed Services Board
of Contract Appeals

I concur

I concur

MARK N. STEMLER
Administrative Judge
Acting Chairman
Armed Services Board
of Contract Appeals

EUNICE W. THOMAS
Administrative Judge
Vice Chairman
Armed Services Board
of Contract Appeals

I certify that the foregoing is a true copy of the Opinion and Decision of the Armed Services Board of Contract Appeals in ASBCA No. 54544, Appeal of Bath Iron Works Corp., rendered in conformance with the Board's Charter.

Dated:

CATHERINE A. STANTON
Recorder, Armed Services
Board of Contract Appeals