

ARMED SERVICES BOARD OF CONTRACT APPEALS

Appeal of --)
)
Propellex Corporation) ASBCA No. 50203
)
Under Contract Nos. DAAA09-88-C-0817)
DAAA09-90-C-0455)

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OPINION BY ADMINISTRATIVE JUDGE JAMES

This appeal arises from the contracting officer's (CO) final decision granting in part appellant's claim under the captioned Army supply contracts for MK 45 primers. The Government rejected four lots of MK 45 primers for alleged non-compliance with the specified maximum moisture content of black powder. The contractor claimed \$1,790,065 for its investigation of sources of excess moisture in the black powder. The Board has jurisdiction of this appeal under the Contract Disputes Act of 1978, 41 U.S.C. § 607. After a nine-day hearing in St. Louis, MO, the parties submitted post-hearing and reply briefs. The Board is to decide both entitlement and quantum (tr. 8).

FINDINGS OF FACT

A. Contract Requirements.

1. On 5 July 1988, the U.S. Army Armament, Munitions and Chemical Command awarded Contract No. DAAA09-88-C-0817 (contract 817) to Propellex Corporation (Propellex) for the firm, fixed price of \$1,595,438.34 to manufacture and deliver 109,348 MK 45, Mod. 1, electric primers, used for the propelling charge of the 5 inch 54 caliber gun. Contract 817 also called for 4,978 MK 153 primers. (Comp. & ans., ¶¶ 2, 10; R4, tabs 1 at 1, 7, 83 at 9; tr. 235-36)

2. After exercise of an option, the total price of contract 817, as last modified by Modification No. P00008 on 20 February 1992, was \$2,305,968.27, including \$68,614.38 for 5,202 MK 153 primers, and \$2,237,353.89 for 160,011 MK 45 primers (R4, tabs 1, 5, 9, 17, 35, 37).

3. On 29 March 1990, the Army awarded Contract No. DAAA09-90-C-0455 (contract 455) to Propellex for the firm, fixed price of \$1,007,939.66 for 68,614 MK 45, Mod. 1, primers (comp. & ans. ¶¶ 3, 10; R4, tab 13 at 1, 3).

4. Contracts 817 and 455 incorporated by reference, *inter alia*, the FAR 52.212-15 GOVERNMENT DELAY OF WORK (APR 1984), 52.243-1 CHANGES—FIXED-PRICE (AUG 1987), and 52.246-2 INSPECTION OF SUPPLIES—FIXED-PRICE (JUL 1985) and DFARS 252.243-7001 PRICING OF ADJUSTMENTS (APR 1984) clauses (R4, tab 1 at 20, 31, 62 of 120, tab 13 at 13, 24, 58-59 of 137).

5. Contracts 817 and 455 prescribed MK 45, Mod. 1, primers in accordance with the following Government documents:

(a) Automated Data List No. 2434755, Rev. C (ADL-C) for contract 817, and Rev. D1 (ADL-D) for contract 455, which listed and modified (i) Assembly Drawing No. 2434755, Rev. H, for contract 817 and Rev. J for contract 455, and (ii) specifications MIL-P-18714, Rev. B2 and MIL-P-223, Rev. B3 for both contracts.

(b) Assembly Drawing No. 2434755, Revs. H and J, which (a) depicted the MK 45 primer having the following parts: (1) stock assembly; (2) ignition element, electric assembly; (3) primer tube, liner and plug assembly, with “flash holes” in the primer tube; (4) Grade N surface primer; (5) Grade A or AV sealing compound; (6) Class 2, MIL-P-223, black powder charge of 800 ± 20 grains; (7) closing cup; (8) Type B moisture-proof varnish; and (9) inner cup, which holds the black powder within the primer tube, and (b) contained the following pertinent Notes, as modified by ADL-C and ADL-D:

8. (M106) . . . [Moisture content of black powder . . . shall meet the requirements as specified in MIL-P-18714.] Drying may be required prior to loading to ensure compliance.
[Brackets in original.]

....

17. All requirements of MIL-P-18714 apply.

(c) Specification MIL-P-18714, Rev. B2, as modified by ADL-C and ADL-D, which provided in pertinent part:

2.1 Issues of documents. The following documents . . . form a part of this specification to the extent specified herein.

....

DRAWINGS

NAVAL ORDNANCE SYSTEMS COMMAND . . .

ADL 2434755 Primer Electric Mark 45 Mod 1

....

3.2.2 Detail Strip. The primer and all its components shall conform to the following requirements:

(a) (C1) Each critical characteristic shall be as specified in the applicable documents listed on DL 2434755.

(b) (M102) Each major characteristic shall be as specified in the applicable documents listed on DL 2434755.

....

3.2.7 Black Powder Moisture Content. (M112) The moisture content of the black powder within the primer shall not exceed 0.70 percent maximum when determined as specified in 4.6.7.

....

4.6.2 Detail Strip. The primer shall be disassembled to determine conformance to all the discernable critical and major characteristics specified on the applicable documents listed on DL 2434755.

....

4.6.7 [numbered ¶ 4.6.8 in contract 455] Determination of Moisture Content. Moisture analysis procedure for the black powder shall be as follows.

- A. Black powder shall be tested in the granular form for moisture content.
- B. The black powder shall be removed from a primer tube and placed in a predried container with a tight cover. Black powder must not be exposed to atmosphere for more than three minutes.
- C. Sample containers must be covered and placed in a desiccator until ready to test the moisture content.
- D. Carefully weigh 2.0 + or - 0.1 grams of sample into a tared weighing dish or container. The sample shall be weighed to the nearest 0.1 MG. Black powder must not be exposed to atmosphere for more than three minutes.
- E. Samples will then be placed in an oven, not covered, at 70 to 75 degrees centigrade (C) (158 to 167 degrees fahrenheit (F)). Do not draw vacuum.
- F. After 4 hours minimum (4 ½ hours maximum), remove samples from oven, cover and place in a desiccator to cool. After cooling, carefully weigh samples to the nearest 0.1 MG. Calculate the percent moisture as follows:

$$A - B = C$$

$$A - D = E$$

$$(E/C) \times 100\% = \text{moisture percent}$$

A - sample + container
 B - container at start
 C - undried sample weight
 D - sample weight plus container weight after drying
 E - weight difference after drying

(d) Specification MIL-P-223, Rev. B3, which provided in pertinent part:

3.3 Moisture content.

3.3.1 *Applicable to classes 2 through 9.* The moisture content of black powder shall be 0.70 percent maximum (max) when determined as specified in 4.4.3.

....

4.4.2 *Preparation of sample for analysis.* A 1-ounce portion of the 1-pound primary sample shall be ground in a suitable mortar to pass a No. 60 U.S. Standard sieve complying with Specification RR-S-366 All precautions shall be taken to avoid unnecessary exposure of the sample to air; hence, as soon as a portion is ground, it shall be placed in a bottle and tightly stoppered. If the grinding and sifting does [sic] not require more than 3 minutes per portion, there will be no appreciable change in the moisture content due to hygroscopicity [*i.e.*, quality of readily absorbing and retaining moisture]. Additional 1-ounce portions shall be ground as needed. The powdered [sic] sample shall be mixed well before analysis.

4.4.3 *Determination of moisture content.* From the ground portion of the 1-pound primary sample, an accurately weighed portion of approximately 2 gm shall be transferred to a tared weighing dish or covered watch glass and dried for 4 hours at 70° to 75°. The dish shall be covered, cooled in a desiccator and weighed The loss in weight shall be calculated in terms of percent moisture. Three such determinations shall be made and the average of the three results reported as the percent moisture in the lot.

(e) “Contractors’ Safety Manual for Ammunition, Explosives and Related Dangerous Material,” DOD 4145.26-M, whose ¶ 3.Q provided that containers used for “intraplant transportation operations or service storage of explosives . . . should be made of material in the following order of preference”: conductive rubber, non-ferrous metal-lined boxes, plastics, paper-lined wooden boxes, and fiber drums, and further stated: “Because of their fragility and potential to fragment, glass containers should not be used.” (Comp. & ans. ¶¶ 5, 10; R4, tab 1, Amend. 0002 at 3 of 3, tab 13 at 9, 17-18 of 137, tab 15 at Attach. 03; SR4, tabs 90, 91 at 8, 11-12, tab 97 at 11, 14-16, tab 265 at P00073; exs. A-3 at A004225, A-6 at A004227, -30, ex. G-5; tr. 73, 80-81, 1398-1406)

6. Revs. H and J of assembly drawing 2434755 provide that surface primer is to be applied to the mating threads of the stock and primer tube and dried for at least 15 minutes, and then sealing compound is to coat at least 75% of the engaged primer tube threads. The stock and primer tube are to be torqued together with 25 ± 5 foot pounds of torque. The paper liner adjoins the inner surface of the primer tube and prevents the black powder from spilling out of the tube’s flash holes during powder loading. The inner cup is located firmly against the loaded black powder. The inner cup is sealed with “3 cc of Type B moisture-proof varnish” applied 360° around the lip of the cup. (Exs. A-3, G-5; tr. 71) The primer tube’s outer surface and flash holes are coated with “purple lacquer” that adheres within the

flash holes and onto the paper liner that is to surround the black powder loaded thereafter (tr. 68-71). The MK 45 primer is not designed to have a total air-tight or hermetic seal, so its black powder potentially can absorb moisture. Respondent did not test the MK 45 primer for air-tightness, and the specifications and drawings are silent on this point. (Tr. 1169, 1173, 1309)

7. The MK 45 primer assembly drawing 2434755 and specifications MIL-P-18714 and MIL-P-223 did not specify the moisture content for loading black powder into the primer tube; they specified only that black powder was not to exceed 0.70% when the Government received it for testing (tr. 1182-83).

8. Contracts 817 and 455 required Government testing of 56 Lot Acceptance Test Samples (LATS), including “detail strip” examination and testing of the black powder moisture content, at the Naval Surface Warfare Center (NSWC), Indian Head, MD, in accordance with MIL-P-18714, Rev. B2, Table 1 (R4, tab 1 at 26 of 120, tab 13 at 17 of 137). Specification MIL-P-18714 designated “critical” and “major” primer characteristics, and its ¶ 3.2.7 specified black powder moisture contents as major characteristic “M112.” Assembly drawings 2434755H and J, specified black powder moisture content as major characteristic “M106.” (SR4, tab 90; exs. A-3, G-5) MIL-P-18714, Rev. B2, Table 1, provided that a lot was acceptable with one “major” detail strip defect, *e.g.*, excess moisture content of black powder, but two or more such defects were cause for rejection (SR4, tab 90 at 3 of 5).

9. The parties referred to moisture content testing as “total volatiles (TV) testing,” because the test process evaporated both water as well as volatiles, such as varnish, sealant and purple lacquer, absorbable by the black powder (tr. 123-24, 1101-01).

10. MIL-P-18714, Rev. B2, required “detail strip” as specified in ADL 2434755 (SR4, tab 90). ADL 2434755 specified MIL-P-223, Rev. B3 (SR4, tabs 91, 97). We find that TV testing of black powder for MK 45 primers was to conform to the requirements of both MIL-P-18714 and MIL-P-223, which are consistent and additive.

B. Propellex’s Black Powder Testing and Loading.

11. Contracts 817 and 455 required Government approval of Propellex’s manufacturing and test procedures (test procedures), which Propellex then was required to follow in performing those contracts (comp & ans., ¶ 12). For contract 817, on 5 October 1988, the Government approved Propellex’s August 1988 test procedures, including its “Black Powder Moisture Analysis Procedure” of 30 September 1985 (ex. A-51 at A001566). For contract 455, on 27 July 1990 the Government approved Propellex’s July 1990 test procedures (ex. A-53 at P00085; tr. 161-62, 165-67, 168-69, 171).

12. Propellex's 30 September 1985 "Black Powder Moisture Analysis Procedure" provided in pertinent part:

3. On opening containers of black powder, visually examine contents for graphite glazing. Powder should have a high gloss. Dull or mottled appearance may indicate inadequate glazing or high moisture content.

If this condition exists, notify your supervisor immediately.

4. Using the thief cup, obtain (3) three samples from each can of powder - one sample from top - one sample from center - one sample from bottom. If sample appears lumped or clustered, samples will be ground in a suitable mortar to pass a No. 60 sieve. Grinding should be done in a minimum amount of time to avoid undue exposure to the atmosphere. (3 min. maximum).

5. Mix ground sample well and place approximately a 2 gram sample into a tared weighing dish [tared = marked with dish's weight (tr. 1926-27)]. Place in desiccator for transporting to weighing area.

6. Using Chain-O-Matic balance, carefully weigh samples to nearest 0.1 mg. Samples will then be placed in the conditioning chamber (not covered) at 70 to 75 degrees centigrade. (158 to 167 degrees F.) Do not draw vacuum.

7. After (4) four hours, minimum, remove samples from conditioning chamber, cover and place in desiccator to cool. After cooling, carefully weigh samples to nearest 0.1 mg.

8. Calculations for moisture content are:

$$\frac{W1 - W2}{W1} \times 100 = \% \text{ moisture}$$

The three determinations made for each container shall be averaged and reported as moisture content of that container. If moisture content exceeds 0.3%, contact your supervisor immediately.

(SR4, tab 87)

13. "Operation 30" in Propellex's approved 3 August 1988 "MANUFACTURING PROCEDURE FOR ELECTRIC PRIMER MK 45 MOD 1 2434755" provided:

- A. All black powder used in lots of primers must be from a single black powder lot
- B. Be sure enough powder of a single lot is available before starting to load. (A full lot, 10,000 primers requires about 2500 pounds of black powder)
- C. Record lot numbers for data cards.
- D. Relative humidity in the loading bay may not exceed 60%.
- E. Inspection will perform moisture analysis. Do not load black powder whose volatile content exceeds 0.3%.

OPERATIONS:

- A. Weigh black powder charge (800 +/-20 grains or 51-53 grams).
Note: Use dead weights supplied to check accuracy of scale after each break in production or if scale is moved, bumped, or otherwise disturbed.
- B. Load charge into primer tube. Use care to assure that the full charge enters the tube

MATERIAL:

. . . Black Powder, MIL-P-223, Class 2

(SR4, tab 92 at P01029-30)

14. Propellex's manufacturing facility included a primer final assembly area (Building 3), and a laboratory (Building 4) for TV testing the black powder, with a system to control temperature and humidity under most circumstances except extremes, and to maintain ½ psi positive pressure within the facility to prevent dust and humidity from entering from outside (tr. 113-16). Building 4 had a "conditioning" room kept at 150-160 degree temperature to evaporate moisture from black powder stored in open kegs for at least 24 hours before its moisture testing. (Tr. 491-92, 505)

15. Propellex used tared aluminum weighing dishes (tr. 103-07, 1926). To weigh black powder samples, Propellex used a Chain-O-Matic balance located on a concrete shelf cast into the laboratory wall for stability and freedom from vibration, encased in glass to prevent air currents from fluctuating the scale readings, and with measuring precision of 1/10 milligram, or .0001 gram (tr. 499-500, 1928-29). Weighing a powder sample took one to two minutes. While weighing a powder sample, another 17 to 35 samples remained in a lidded pan. Samples removed from the oven were placed in a desiccator. (Tr. 501, 1929, 1934, 1950)

16. Before loading, Propellex tested black powder moisture content as follows:

<u>Contract/ Lot</u>	<u>Tester</u>	<u>Date</u>	<u>Samples per bar- rel documented</u>	<u>Exhibit</u>
817/6	Krummel	6-90	3	A-117
455/1	Polley	5/6-91	1 or 2	A-120
455/2	Polley	9/10-91	1, 2 or 3	A-123
455/3	Polley	10-91	1 or 2	A-126

Propellex’s test records appear incomplete. Powder mixer Mike Polley testified credibly that he “always” took three samples per barrel (tr. 1924-25, 1929, 1945), and we so find. All such samples were at or below 0.3% moisture, without averaging (exs. A-116, -117, -120, -123, -126).

17. Mr. Polley: (a) handled black powder weighing dishes with his bare hands, and (b) drew 4-6 pounds vacuum on the oven, just enough to keep its door closed, every time he performed TV testing (tr. 1922, 1931, 1933-34, 1947-48). The record contains no proof that such handling and vacuum affected black powder weights.

18. Propellex transferred: (a) black powder tested at or less than 0.3% moisture to Building 3’s conditioning room, kept at 120° (F.), for loading MK 45 primers (tr. 123, 128-29, 506), and (b) primer tubes in open crates, with tarps in bad weather, from its Edwardsville facility to storage at its Elm Point facility, prior to assembling them into primers in Building 3 (tr. 667-68, 1967, 1976-78). During cold weather, tubes brought to Building 3 had moisture condensation. Propellex rolled the tubes on rags to dry them at least 24 hours before using the tubes in production (tr. 626-27, 669-71).

19. Before loading primers, Propellex checked the black powder container tags to verify that their moisture content had been tested below 0.30% (tr. 614-15, 637, 738-39). Propellex checked relative humidity in Building 3 at least twice daily, in the morning and after lunch, and occasionally in the black powder loading bays, by use of a “sling cyclometer” (SR4, tab 259; tr. 495, 516, 569-70, 612-13, 637, 645-49, 652-53, 657, 735-37). If the relative humidity exceeded 60%, Propellex stopped loading operations and returned the black powder to the conditioning room (SR4, tab 138).

20. Propellex removed black powder from the large containers by a metal scoop into small pans from which it loaded powder into the primer tubes. Propellex inserted the inner cup against the black powder in the primer tube, injected three cubic centimeters of varnish thereon, dried the inverted primer for 15 minutes to drain excess varnish, and performed 100% inspection to assure the inner cup was varnished around its 360° circumference (tr. 515, 518, 606, 637-41). Black powder could await loading in an uncovered container for a day's shift, without violating Propellex's approved manufacturing and test procedures (tr. 643-45, 1963, 2009-10).

21. In Building 3, Propellex placed completed and finally tested MK 45 primers in the Government-specified steel containers designed to hold 200 primers, which were kept in the building's conditioning room. From bottom to top, the containers had a circular plywood disk, layers of styrofoam with pre-punched holes (for inserting primers and dowels) aligned with two wooden dowel rods, a sheet of conductive plastic over the primers, a circular plywood disk over the plastic sheet, and fiberboard fillers to occupy the remaining void space. After a lot was completed, each container was sealed with a clamping ring around its lid. (Tr. 175, 521-24, 1277-78; ex. A-204 at 113-14)

22. Propellex manufactured and tested the primers under contract 817 and 455 in the presence and with the approval of the Government's resident Quality Assurance Representative (QAR) (comp. & ans. ¶ 15). Charles Hinkle, the QAR, was not aware that Propellex ever loaded MK 45 primers with black powder when the required humidity was exceeded, or when its humidity controls were not working properly (A-204 at 106-07), and did not see water or moisture in Propellex's shipping containers or any of their wooden and other internal components (ex. A-204 at 108-09). Mr. Hinkle selected 56 primers from each lot for final lot acceptance testing at NSWC (tr. 173-74, 176, ex. A204 at 48-49).

C. Rejection of MK 45 Primer Lots for Excessive Black Powder Moisture and Other Major Defects.

23. In September 1990 Propellex shipped to NSWC for lot acceptance testing (LAT), samples from lot 6 under contract 817 (comp. & ans. ¶ 16). After 4 September 1990 TV testing, on 18 October 1990 the CO rejected lot 6, alleging that, based on two tests per sample, two of five black powder samples exceeded 0.70% moisture content, and one primer lacked black powder (SR4, tab 113; R4, tab 19; ex. A-24 at A002808-12).

24. The CO or her representative stated that the excess moisture in the primers in lot 6, contract 817, was the fault of Propellex, and Propellex was required to find the source of, and to resolve, the excessive moisture problem (comp. & ans. ¶ 18; tr. 428, 1720). On 6 May 1991, NSWC tested 16 more lot 6 samples, and found that only one exceeded 0.70% moisture (ex. A-29).

25. On 6 December 1991, the CO waived what she called the “high moisture content” of lot 6, contract 817, for a \$700 price reduction (SR4, tab 178). That waiver was formalized on 14 January 1992 in bilateral Modification No. P00007 to contract 817, which contained no contractor release of claims (R4, tab 35 at 1, Attach. 3). Propellex made final shipment on contract 817 on 16 December 1991 (R4, tab 31).

26. NSWC’s 18 November, 17 December, and 18 December 1991 TV testing under contract 455, based on two tests per sample, reported noncompliant black powder moisture content in five lot 1 samples, five lot 2 samples, and one lot 3 sample. The CO rejected lots 1-3, contract 455, on 27 December 1991, 8 January 1992, and 10 February 1992, respectively, for excess moisture and other defects. (Exs. A-30, -31, -32, -176 at A007122-24, -56-58, -59-61; R4, tabs 32, 33, 36)

27. The CO waived the black powder moisture content of lots 1-3 under contract 455 on 12 May 1992 for a \$750 price reduction, which waiver was formalized in contract 455 bilateral Modification No. P00004 on 29 May 1992 (R4, tab 43). Respondent accepted lots 1-3 under contract 455 on 29 June 1992 (ex. A-181A at 27-32).

28. Respondent accepted the final lot (5) on contract 455 on 15 June 1993 (R4, tab 56). The primer lots that respondent rejected were lot 6 under contract 817 and lots 1-3 under contract 455. Propellex’s later claims, however, alleged that it incurred increased costs due to such rejections on contract 817, lots 6-9, and on contract 455, lots 1-5 (*see* finding 53).

D. Propellex’s Investigation of the Causes of Excess Moisture in Black Powder.

29. In October-November 1990, and September-November 1991, Propellex took 394 powder samples from lot 6, contract 817, and lots 1-3, contract 455, from one or two primers randomly selected per barrel, and from the top, middle, and bottom of barrels of lots 6 and 3. Mr. Polley tested and determined the moisture content of all samples to be less than 0.70%, without averaging. (Ex. A-83 at A001788-92, -1819-21, -1823-27, exs. A-118, -121, -124, -126; tr. 526-32, 538-39, 546-48) Propellex also tested black powder samples during loading, and found them to have from .1 to .2% moisture content (SR4, tabs 134, 138; tr. 1963-65, 1970-71, 1974-76).

30. Propellex took 45 primer tubes with purple lacquer of various thicknesses, loaded them with black powder of known moisture content, placed them in a humidity chamber with nearly 100% humidity, and measured their black powder moisture content. Propellex found that the purple lacquer adequately sealed the flash holes so that moisture could not be transmitted through the lacquer into the black powder. (Tr. 548-52, 574-76)

31. Since the paper liners are very absorbent, from November 1990 to January 1991 Propellex exposed paper liners to humid conditions, measured their moisture content in the

same manner as for black powder, loaded primer tubes with paper liner of a known weight, allowed them to stand for several days, analyzed the increase in black powder moisture content. Propellex concluded that even with a high percent of moisture in the liner, it would not substantially increase the black powder moisture content, since the liner was about .1 gram, while the powder was 52 grams (tr. 73, 553-54; 2221-22).

32. In June 1991, Propellex performed TV testing on the inner cup to determine (a) how much moisture the cup could absorb under normal conditions, and found that it did not impart any substantial moisture to the black powder (tr. 556-57), and (b) the absorption of Type B varnish into black powder by applying differing quantities of such varnish to the inner cup, and found that most of the varnish soaked through the cup into the black powder (tr. 557-58). Propellex increased the inner cup drying time to one to two hours, and found a lower black powder moisture content than after the 15-minute drying time stated in its manufacturing Operation No. 32 (SR4, tab 92 at P01034; ex. A-83 at A001810, -15). Propellex changed the inner cup drying time to one hour in its manufacturing procedures in November 1992 (SR4, tab 207 at P00913; tr. 1999-2000).

33. Propellex injected black powder loaded in primer tubes with dry nitrogen, to determine whether it could reduce the moisture content. Propellex concluded that dry nitrogen processing had no appreciable effect on lowering black powder moisture content and was impracticable due to the extra time and cost to perform the process. (Tr. 560-62)

34. Propellex diverted some of its powder mixers, inspectors and test personnel from MK 45 production work to perform the foregoing investigations, delaying black powder moisture analyses and primer production (tr. 450-52, 456, 534-36, 1999). On 16 February 1993, Propellex sent the results of its investigations to the CO (ex. A-83).

E. Respondent's Black Powder Unloading and TV Testing.

35. NSWC performed a 40-step "detail strip inspection" of lot 6, contract 817, and a 43-step strip inspection on lots 1-5 under contract 455, in its Buildings 466 and 600. NSWC unloaded black powder from five primers from lot 6 under contract 817 for inspection step 15, "Black Powder Moisture Analysis is .5% [sic] max.", and from all lots under contract 455 for inspection step 20, "Verify sample to Lab for moisture analysis (.7% max)". (Ex. A-24, -26 to -28, -31 to -34; tr. 1204-05, 1216-17)

36. NSWC used its 2 April 1990 "Special Job Procedure" No. 298-215 to disassemble MK 45 primers in October 1990 on lot 6 under contract 817, and in April 1993 on lot 5 under contract 455 (ex. A-83 at A001790; tr. 1619-20). That procedure required NSWC to remove the primer's closing and inner cups, to place masking tape over the open primer tube end, to pour powder into a pan and move it to a calibrated balance, to weigh and to record the sample weights, to place the samples into a container "dried at least one hour at 140° F" with a tight cover secured by tape, and to tag and place the containers in

a desiccator for transportation to the test laboratory, NSWC Building 600. Following those steps was the statement: “WARNING: THE SAMPLE MUST NOT BE EXPOSED TO THE ENVIRONMENT MORE THAN 3 MINUTES.” (SR4, tab 108 at 6-7; tr. 1169, 1587-88, 1596, 1618-24) NSWC’s explosive operator Cal Williams, who unloaded black powder many times, estimated that about 35 seconds elapsed between the removal of the inner cup from the primer tube and placing the black powder in the sealed desiccator (tr. 1622).

37. When unloading black powder from Propellex’s primer lots under contracts 817 and 455, NSWC did not verify or record the temperature and humidity levels in building 466, which had air conditioning, heating, a thermostat and a humidity indicator. Building 466’s control panel to control humidity was not operational on or before 7 April 1993. (Ex. A-65 at A002180; tr. 1604-08, 1611-13, 1632-33) Before June 1993 NSWC had no relative humidity level requirement when unloading black powder (tr. 1224-25).

38. NSWC’s July 1990 “Procedure for Black Powder % TV” (the SOP) provided:

Step 1. Sample is received in building 103 and code 3032 is called. Normally 3032 personnel will pick it up immediately.

Step 2. Take a clean, dried weighing bottle* (KIMAX 50/12, 35ml capacity) that has been dried in glassware oven and stored in a desiccator over drierite and record empty weight. Weighing bottle is handled while wearing gloves through-out procedure. This test is run in a Mettler Electronic AE-160 series balance. (readability to 0.0001)

Step 3 Open black powder container and weigh up approximately 2.0000 grams into weighing bottle.

Step 4. Place sample in oven at 70°C for 4 hours with lid ajar.

Step 5. Remove weighing bottle from oven and completely close weighing bottle with lid.

Step 6. Immediately place weighing bottle with sample into desiccator over drierite for 15 to 20 min. to cool.

Step 7. Re-weigh cooled weighing bottle with sample.

Step 8. Calculate percent total volatiles as follows:

$$A-B = C$$

$$A-D = E$$

$$(E/C) \times 100 = TV\%$$

A - Sampler [sic] plus weighing bottle weight: undried

B - Weighing bottle at start

C - Undried sample weight

D - Sample plus weighing bottle weight dried

E - Weight difference after drying

*weights of weighing bottle include lids

(SR4, tab 121; tr. 889-900) NSWC used this SOP for LAT of contract 817, lot 6, in September 1990 (SR4, tab 113; ex. A-60) and for LAT of contract 455 from 1991 to April 1993 (tr. 981).

39. NSWC's policy was to test black powder samples as soon as they were received to avoid moisture contamination by absorption (tr. 889-90, 1216, 1658-59, 1691-93). NSWC's technician Richard Nicol, who performed TV testing, estimated that powder samples were exposed to the atmosphere about 2½ minutes (tr. 1697-1701). To weigh samples, he and NSWC technician Rhonda Frey used a Mettler EA-160 or AE-200 digital scale that was calibrated annually (tr. 1016-19, 1694-96).

40. NSWC did not (a) measure or automatically control the temperature or humidity in Building 600 on or before 7 April 1993 (ex. A-65 at A002180; tr. 905-07, 1696), and (b) grind portions of a 1-pound sample pursuant to specification MIL-P-223B (tr. 860, 1711). NSWC let the powder samples from lot 6, contract 817 and from lots 1-3, and 5 under contract 455, cool for 30 minutes (tr. 1697, 895, 981; exs. A-30, -31, -32, -34). NSWC found that by allowing the powder sample to cool for 30 minutes rather than 20 minutes (Step 6 of NSWC's July 1990 procedures), more consistent weights were recorded (tr. 895-98). NSWC determined the moisture content of black powder samples not by averaging three results, as specification MIL-P-223B, ¶ 4.4.3, required, but rather by averaging two results, due to alleged internal safety restrictions on the amount of black powder that could be dried at one time, which variant procedure can produce less accurate test results (tr. 857-59, 1131-32, 1136, 1712-15).

41. In May 1991, NSWC's "PhysChem Laboratory Quality Control Manual": (a) prescribed procedures for review of analytical data for all projects and programs in NSWC's PhysChem Laboratories (¶ 1.2); (b) provided that "[t]ests done by unauthorized procedures are not valid Data gathered by unauthorized procedures . . . cannot be used to accept or reject materials" (¶ 3.3.a); (c) defined "outlier data points" as "results which differ so much from the average that they are highly improbable"; (d) provided criteria to identify and reject outliers:

3.5.7 . . . For small sets of data (for n less than 25), the Dixon criterion can be used An alternative rule of thumb which is roughly equivalent to Dixon's criterion is: "In a set of data, a value is an outlier if the gap between it and its nearest neighbor is more than half of the overall range of values."

and (e) gave an example of an "outlier" 0.019 from the nearest of four other data, and more than half the 0.026 data range. (Ex. A-128 at A010570, A010588).

42. Ms. Frey understood that NSW C's outlier criteria applied to data from one black powder sample, and sometimes used a subjective criterion of an outlier exceeding other data by .29 or by .5 on duplicate powder samples from contract 455 (tr. 916, 918-22, 986-90; ex. A-175 at A007558, A007575).

43. On 7 April 1993, Defense Contract Management Agency's quality assurance engineer, Bryan Nussbaum, and Propellex's consultant (and general manager from 1961 to 1991) Edward Williams, observed NSW C's LAT of lot 5, contract 455, including the unloading of black powder from five MK 45 primer samples and the TV testing of those black powder samples by Ms. Frey (exs. A-66 at A002189-91, A-65 at 1; tr. 46, 247-49, 791-92). Mr. Nussbaum's reported observations generally corresponded to NSW C's Special Job Procedure No. 298-215 for unloading, and to its SOP for TV testing, of black powder, with some discrepancies (ex. A-65 at A002179-80; tr. 797-98, 831-32). He noted that Ms. Frey designated and disregarded an "Out Lier" on the TV test result on sample No. 1 (ex. A-65 at A002181, A-176 at A007558; tr. 918).

44. On or about 21 June 1993, Mr. Williams weighed glass bottles before and after oven-drying them, and found differences in weight of the same bottle, ranging from 0 to .27% (ex. A-66 at A002192-94), though he questioned his own accuracy (tr. 297-98). On 23-24 June 1993, Messrs. Nussbaum, Williams, and others observed Ms. Frey's TV testing at NSW C of 10 Propellex black powder samples not under contract 817 or 455 (exs. A-66 at A002195, A-65 at 6, A-175 at A007560; tr. 247-49, 791-92). Without noting the interval after their initial dried weight, or whether the samples were placed in a desiccator, NSW C re-weighed the black powder samples and found that seven had higher, and three had lower, weights than those first recorded. Those inconsistent weights were of concern to Mr. Nussbaum and Ms. Frey. (Ex. A-65 at A002186; tr. 818-23, 961-66, 1072-74, 1139-40)

45. At Propellex's request, on 23-24 June and 7 July 1993, Ms. Frey performed TV testing and some re-testing of empty glass weighing bottles, and found that they lost or gained from .0020 to .0043 grams weight. Such weight losses could artificially elevate Propellex's black powder test results if done with the same bottles. None of the bottles tested in 1993 corresponded to the bottles used in TV testing of lots 1-3, contract 455, in 1991. (Ex. A-176 at A007561, -63, -68; tr. 939-40, 945-49)

46. Suzanne Wolfe, NSWC's Branch Manager for quality acceptance, stated that (a) for weighing with precision to four decimal places, a marble weighing table was more stable than an ordinary laboratory bench, which was susceptible to vibration which varied the last two digits of scale readings (tr. 1097, 1112, 1115-16), and (b) observers and a window air conditioner and its air flow contributed to scale vibration and variations on the ordinary laboratory bench, while weights taken on a scale on a marble weighing table were consistent (exs. A-65 at A002186, A-72 at ¶ 4, G-6; tr. 993-99, 1116-18, 1137-39, 1147). The record does not contain any proof of inaccurate scales or weight readings by either Propellex or NSWC.

47. On and after 23 June 1993 – eight days after the last lot of primers under contract 455 was accepted – NSWC used laboratory procedures different from those used on 7 April 1993. NSWC began to record relative humidity in the test laboratory, to use aluminum weighing dishes, to require weighing on the marble table, and to stop black powder unloading and TV testing if the humidity exceeded 55%. (Ex. A-73, A-74 at ¶ 5; tr. 831, 1067, 1070-71) After later studies of the wooden components of the primers' shipping container, respondent changed those components (but not under contract 817 or 455) to polyvinyl chloride and polyethylene foam, to minimize possible moisture contamination of black powder in the primers (exs. A-94, -110, -99; tr. 1291, 1305).

48. Dr. Douglas Olson, holder of a PhD in physical chemistry and respondent's expert in combustion, decomposition, kinetics and chemistry of explosives and energetic mixtures (SR4, tab 269), investigated black powder moisture absorption in August-September 1998 at New Mexico Tech. at 50-55% relative humidity and 25°C, and reported his test results to respondent (SR4, tab 273 at A009784; tr. 2138). Dr. Olson also provided opinions on Propellex's black powder loading and test procedures for areas of possible moisture contamination (ex G-4 at 77; SR4, tabs 271, 272, 274).

49. On 27 August 1998, NSWC sent Dr. Olson a 25-gram sample of black powder taken from Propellex lot PXX95C001-001B (ex. G-4 at 12-13, 40-41; SR4, tab 273 at A009784; SR4, tab 276 at P1, P2; tr. 1379-80, 1382-84, 2136-43). Propellex produced lot PXX95C001-001B in about 1995 (ex. G-4 at 12), not under contract 817 or 455.

50. The requirements of Propellex's contract in 1995 with respect to black powder are not in evidence. The Board declines to speculate whether the black powder Dr. Olson tested from Lot PXX95C001-001B complied with the requirements in ADL 2434755, Rev. C or D1, specification MIL-P-18714, Rev. B2, and specification MIL-P-223, Rev. B3, and the same Propellex manufacturing and test procedures that respondent had approved for contracts 817 and 455 (tr. 1384-85). The temperature, humidity, test equipment and test procedures Dr. Olson used in August 1998 to test black powder did not correspond to the environmental conditions, test equipment and procedures used by Propellex in 1990-91 or by NSWC in 1990-93 in loading and testing black powder in Lot 6 under contract 817 and

in Lots 1, 2, 3, and 5 under contract 455 (ex. G-4 at 38; tr. 2028-38, 2045, 2078-79, 2095). The Board attaches no probative weight to Dr. Olson’s conclusions and estimates with respect to black powder’s moisture absorption rate.

51. Dr. Olson had no personal qualifications in loading Class 2 black powder into MK 45 primer tubes. Prior to August 1998, Dr. Olson had no personal experience in testing Class 2 black powder. (SR4, tab 269; tr. 2024) Dr. Olson did not personally observe or replicate Propellex’s black powder loading and testing procedures, but only critiqued its written test procedures for sources of possible moisture contamination of black powder (tr. 2074-77, 2086). Dr. Olson performed no test or experiment with respect to the procedures for loading and testing Class 2 black powder (tr. 2096, 2098, 2101, 2103-07). The Board attaches no probative weight to Dr. Olson’s opinions and conclusions with respect to Propellex’s black powder loading and testing procedures for areas of possible moisture contamination.

F. Propellex’s Claim and Appeal.

52. On 27 December 1993, Propellex submitted to the CO claims under contract 817 in the amount of \$887,766, and under contract 455 in the amount of \$665,019. Neither claim submission included the phrase “the amount requested accurately reflects the contract adjustment for which the contractor believes the government is liable” required by the then current CDA certification. (Exs. A-37, -38; tr. 1787-88)

53. On 16 September 1994, Propellex submitted to the CO a revised claim properly certified under the CDA in the amount of \$1,790,065 under contracts 817 and 455 (R4, tab 66). We find that the CO received that claim on about 21 September 1994. The 1994 claim was prepared on a total cost basis and included the following elements:

A) Contract 817, Lots 6-9:

Total cost of performance (including 10% profit)	\$1,857,053
Contract price	<u>(1,046,181)</u>
Increased cost of performance	\$ 810,872
Claim preparation costs	<u>+ 23,333</u>
Total	\$ 834,205

B) Contract 455, Lots 1-5:

Total cost of performance (including 10% profit)	\$1,656,039
Contract price	<u>(1,007,940)</u>
Claim	\$ 648,099

Consulting expense	+ 16,920
Increased cost of performance	\$ 665,019
Unabsorbed overhead	+ 109,018
Claim preparation costs	+ 23,333
Total	\$ 797,370

C) 10% profit on amounts for both con- \$ 158,490
tracts (exclusive of claim preparation)

D) Total claim (A + B + C) \$1,790,065

(Ex. A-159 at A001065-69) Propellex acknowledged that the claimed profit of \$158,490 duplicated profit already included in the increased performance costs and, therefore, should have been omitted (ex. A-180 at 2; app. br. at 108).

54. CO Janice Isenberg reviewed Propellex’s claims. Her internal memorandum of 18 January 1996 listed questionable Propellex and NSWC testing procedures, stating, “The Government acknowledges moisture testing at Indian Head was not performed as it should have been” (ex. A-95 at A000646). She met with Propellex on 14 February 1996 to negotiate the claim, and offered Propellex \$77,325 to settle the claim (ex. A-97; tr. 1467, 1516-17). Her 5 September 1996 final decision on Propellex’s 16 September 1994 amended claim acknowledged that the Government “had some culpability” and was responsible for some of the additional costs Propellex incurred, allowed \$77,325, and denied the balance of the claim (R4, tab 79; tr. 1461-62, 1484-85). Propellex timely appealed that final decision to the ASBCA (R4, tab 80).

G. Quantum.

55. As adjusted by the time of the hearing, Propellex claimed \$1,356,580 on a modified total cost basis, consisting of \$697,884 on contract 817 (\$810,872 less a \$112,988 adjustment), \$587,632 on contract 455 (\$665,019 less a \$77,387 adjustment), \$28,901 of unabsorbed overhead costs on contract 455, and \$42,163 in claim preparation costs (exs. A-180 at 2, A-159).*

56. Propellex’s accounting system recorded the direct labor hours and costs of each manufacturing operation (tr. 1790, 1809-10, 1835; ex. A-180 at 3). Propellex did not segregate and record the hours or costs of its investigation of the causes of MK 45 black powder moisture, and thus commingled such investigative hours and costs with all 1990-92 labor hours and costs, because initially it did not think that respondent was responsible for

* Appellant’s brief refers to \$1,339,660, reflecting an apparent error in its expert’s report, the omission of the \$16,920 consulting expense (compare app. br. at 131 and n.35; ex. A-180 at 2; finding 58, *infra*).

the problem (SR4, tab 242; ex. A-180 at 3, A-205 at 16; tr. 1782-83, 1790, 1830-33, 1836-37). After it incurred such investigative costs, according to Propellex, it found no way to reconstruct or to estimate them accurately (tr. 1790-93, 1893-95).

57. Propellex based its 1988-1990 offers for contracts 817 and 455 on average hours and costs incurred per labor operation on prior MK 45 primer lots, current material quotations, manufacturing and general and administrative costs from historical data and rates calculated by its parent company, Essex Industries, and a 10% profit (tr. 147-49, 151-58, 1773, 1777-81, 1810, 1815). Based on price competition between three offerors on contract 817 and two offerors on contract 455, the CO determined that Propellex's low offers on both contracts were fair and reasonable (ex. A-181G at A010248-49, A010360-61; tr. 755-57).

58. The Defense Contract Audit Agency (DCAA) found that Propellex's total costs incurred on contracts 817 and 455 were supported by its accounting records, and did not question any of its costs incurred (exs. A-137 at A000912-14, A-180 at 5). DCAA reviewed Mr. Williams' \$16,920 consultant fees and expenses for his services in 1993, and found that Propellex had paid him \$6,920.51 (ex. A-148 at A001343).

59. In August 2000 Margaret Worthington, CPA, ex-DCAA auditor, and Propellex's expert accounting witness, calculated on a modified total cost basis a contractor-responsible labor cost of \$17,491.78 on contract 817 for hours incurred for abnormal grinding on lots 6-7, abnormal inspection on lot 6, weighing primers for missing black powder charges on lots 6-9, and "other overruns" on lots 6-9; and a contractor-responsible labor cost of \$1,583.32 for weighing primers for missing black powder charges on lots 4 and 5 on contract 455 (exs. A-180 at 5-6, A-180C, E, F, G, J; A-205 at 25-27; tr. 184-87). She asserted that the entire material cost overrun on contract 455 was the Government's responsibility (exs. A-180 at 6, 8, A-181E, A-205 at 27). She determined that Propellex's unabsorbed overhead cost recovery on a concurrent Navy contract resulted in a \$45,923 overhead cost reduction under contract 455. Ms. Worthington's totals of contractor-responsible costs with overhead and G&A were \$102,716 on contract 817 and \$70,352 on contract 455 (exs. A-180 at 8-9, A-205 at 33).

60. Propellex did not introduce in evidence any estimate of the hours or costs it incurred between October 1990 and November 1992 to investigate the potential sources of excessive moisture in its black powder. Propellex documented that it performed additional moisture testing of black powder samples, paper liners, inner cups and varnish, as well as nitrogen drying experiments. Those records, however, do not show the number of persons or labor hours, or the amounts of materials for such investigation. (Exs. A-83, -118, -120, -123, -126) Therefore, the Board has inadequate evidence to make a reasonable approximation of the costs of such investigative work.

61. The “modified total cost approach” that Ms. Worthington calculated did not exclude from the amounts Propellex claims other costs not arising from MK 45 primer black powder moisture investigation, including the costs: (a) to produce 5,202 MK 153 primers that Propellex included in its claimed \$1,857,053 “total cost of performance” under contract 817 (exs. A-159, -181F); (b) to perform breakaway torque testing, scrapping and demilitarizing of 3,982 primers in lots 1-3, contract 455 (SR4, tabs 182, 186, 205, 279, 281, 284, 293, 296; R4, tab 43); (c) to scrap and demilitarize 6,000 primers that Propellex itself rejected for excess moisture content under lot 1, contract 455 (SR4, tabs 224, 235, 245, 294; tr. 544); (d) to scrap and demilitarize 261 primers under lot 5, contract 455 (SR4, tabs 229, 232, 237); and (e) to resolve stock component vendor problems under contract 455, lot 5 (SR4, tabs 209-12, 219).

62. The Board reviewed the appeal record, including Propellex’s documents and DCAA’s work papers, very carefully to determine whether one can make a reasonable approximation of the costs of other than black powder moisture investigation omitted from Ms. Worthington’s “modified total cost” calculations. The appeal record does not permit such approximation because of the: (a) presence of MK 45 and MK 153 primer costs that are irreconcilable with Propellex’s claimed “total cost of performance” and with the DCAA work papers (exs. A-180 at 8, A-181F at A001292), and (b) absence of hourly labor costs and material costs incurred under the affected primer lots and needed for such approximation, that are free of Propellex’s black powder moisture investigation costs (exs. A-180J, -180O).

63. Propellex’s 16 September 1994 claim included \$109,018 for unabsorbed overhead on contract 455 during an alleged delay from 31 March to 30 June 1992 due to black powder moisture. According to Propellex, during those 91 days its labor was on standby and it was not practical to bid for additional business due to the short lead time. (R4, tab 39 at 2; exs. A-159 at A001064, A-181F at A000894; tr. 1796-99, 1827-29) Propellex credited the Government with unabsorbed overhead costs recovered on a concurrent Navy contract, reducing its unabsorbed overhead claim to \$28,901 (exs. A-180 at 9, A-205 at 33-35). Respondent’s monthly Production Progress Reports under contract 455, and Propellex’s delivery data, show that Propellex performed breakaway torque testing, reworked, produced and delivered 13,729 primers in lot 4 in May 1992 and 42,760 primers in lots 1-3 in June 1992 (SR4, tabs 197, 200, 281; ex. A-181A at 27). To the extent that performance of contract 455 was delayed or suspended during the period 31 March to 30 June 1992, we find that Propellex’s retesting and rework of defective primers was a contributory cause thereof.

64. Propellex refined its claim preparation cost calculation to \$42,163, comprised of \$25,497 in attorney fees charged for services from January to 16 September 1994 and \$16,666 in costs incurred by Propellex’s Controller, Bert Nordman, and its Vice President Ron Jones, in preparing the claims in 1994 (ex. A-180 at 9, A-205 at 35-36). We find that

appellant has not proved that the costs incurred by its officers were not already included in overhead (tr. 1843-44).

65. Pursuant to the DFARS 252.243-7001 PRICING OF ADJUSTMENTS (APR 1984) clause, (a) on the date of contract 817, FAR 31.205-33(d) made unallowable “costs of legal, accounting and consultant services and directly associated costs incurred in connection with . . . prosecution of claims or appeals against the Government” and (b) on the date of contract 455, FAR 31.205-47(f) made unallowable “costs . . . incurred in connection with—(1) . . . the prosecution of claims against the Federal Government.”

DECISION

I.

Respondent initially rejected lot 6 under contract 817 and lots 1-3 under contract 455, but later waived their alleged noncompliance and accepted those lots (findings 25, 27). Improper rejection of conforming work resulting in the incurrence of costs to investigate their alleged nonconformity is a constructive change. *See Unexcelled Chemical Corp.*, ASBCA No. 2399, 60-1 BCA ¶ 2587 (Navy initially rejected igniter lots for premature firing, asked the contractor to investigate possible causes of such firing, eventually eliminated the firing time requirement, and accepted the rejected igniters. Investigation disclosed that adding “nitrocotton” to the “squib” component during the igniter contract performance, known to Navy but not to the contractor, was cause of premature firing; held, the contractor was entitled to recover under Changes clause for investigating, disassembling igniters, testing squibs, and reassembling igniters); *Texas Trunk Co.*, ASBCA No. 3681, 57-2 BCA ¶ 1528 at 5403-04 (Government improperly rejected 358 “field desks” on the basis of an invalid “boil test,” required the contractor to replace the rejected items, but later agreed to accept rejected items and components; held, improper rejection was a compensable change, entitling contractor to recover costs of replacement work).

As stated by the Court of Claims in *Southwest Welding & Mfg. Co. v. United States*, 413 F.2d 1167, 1176 n.7, 188 Ct. Cl. 925, 940 n.7 (1969) in “inspection and rejection” cases: “When the Government rejects work as being not in compliance with its specifications, the . . . burden is upon the Government to demonstrate that fact,” citing *Hardeman-Monier-Hutcherson*, ASBCA No. 11785, 67-1 BCA ¶ 6210 (at 28,748-49) and other decisions. This Board has further explained the rules of burden of proof in such cases:

When the Government opted to make that showing [of noncompliance of the rejected product] with [laboratory test] reports . . . a presumption arose that the tests had been properly conducted and that the results were accurate. [The contractor] was then required to rebut that presumption with evidence

either that the Government's test results were invalid or that testing conducted by [the contractor] showed the products to be in conformity with the specification. Upon the production of such proof, the Government would be entitled to prevail as to the rejection only if a preponderance of the entire evidence showed nonconformity of the product to the specifications.

Tempo, Inc., ASBCA No. 37589, 95-2 BCA ¶ 27,618 at 137,661-62.

Contracts 817 and 455 required respondent to perform a "detail strip inspection" of MK 45 primers as a condition of their acceptance, including TV testing of their black powder moisture content. TV testing was to be in accordance with the requirements of both specifications MIL-P-18714, Rev. B2, and MIL-P-223, Rev. B3. (Findings 10, 35) Findings 5(b)-(d) state the procedural requirements and acceptance criteria for TV testing. Respondent's NSWC test reports showed noncompliance of the rejected lot samples with the 0.70% black powder moisture content requirement (findings 23, 26), thereby satisfying respondent's burden of going forward with proof of nonconformity.

Propellex adduced evidence of invalidity of the NSWC test data. Respondent's "SOP" for TV testing did not limit exposure of black powder samples to three minutes, as required by specification MIL-P-18714B, ¶ 4.6.7B, D (findings 5(c), 38). However, we have found that NSWC exposed Propellex's black powder samples about 2½ minutes (finding 39). Respondent did not grind black powder samples taken from Propellex's MK 45, and it did not determine their moisture content by averaging the test results on three samples, in accordance with ¶¶ 4.4.2 and 4.4.3 of MIL-P-223, but rather from two samples, which can produce less accurate data (finding 40).

Respondent argues that MIL-P-18714B was "the controlling specification" for TV testing, and thus it did not have to comply with MIL-P-223B requirements to grind and average three black powder moisture content tests (Gov't br. at 165-66). This argument is fallacious. Contracts 817 and 455 required respondent to test lots of MK 45 primers, including detail strip inspection, in accordance with MIL-P-18714, Rev. B2, Table 1 (finding 8). Specification MIL-P-18714B required detail strip inspection as specified in ADL 2434755, which, in turn, expressly specified MIL-P-223B. Thus, respondent was required to test primers in accordance with both specifications MIL-P-18714 and MIL-P-223, whose requirements are consistent and additive. (Finding 10)

NSWC's Laboratory Quality Control Manual provided that tests done by unauthorized procedures were not valid, and data gathered by unauthorized procedures could not be used to accept or to reject materials (finding 41). Thus, respondent's testing of Propellex's black powder samples did not wholly comply with the requirements of contracts 817 and 455, and its test results were not valid.

For Propellex's pre-loading TV testing of MK 45 primer lot 6 under contract 817 and of lots 1-3 under contract 455 in June 1990 and May, September and October 1991, Propellex took triple samples from each black powder barrel, and all samples tested at or below 0.3% moisture content, without averaging (finding 16). When Propellex tested additional samples from lots 6 and 1-3 in October-November 1990 and September-November 1991, all 394 samples had less than the specified 0.70% moisture content. Propellex's sampling before loading and after unloading powder following lot rejections, did not average the results of three samples as ¶ 4.4.3 of specification MIL-P-223B required. (Findings 16, 29) However, all samples Propellex tested complied with the maximum moisture requirement, so averaging such samples could not alter those results. A Propellex powder tester drew a 4-6 pound vacuum on the oven, contrary to its September 1985 Black Powder Moisture Analysis Procedure. The record contains no proof that such vacuum affected black powder weights. (Findings 12, 17) The record does not contain any proof of inaccurate scales or weight readings by either Propellex or NSWC (finding 46).

We hold that respondent did not establish that it conducted the disputed lot acceptance tests in accordance with the contract testing requirements.

II.

To recover under the total cost method of quantifying an equitable adjustment, the contractor has the burden of establishing the following elements: (1) the impracticability of proving actual losses directly; (2) the reasonableness of its bid; (3) the reasonableness of its actual costs; and (4) lack of responsibility for the added costs. *See Servidone Const. Corp. v. United States*, 931 F.2d 860 (Fed. Cir. 1991). Propellex has advanced a modified total cost method. Its expert adjusted its bid for possible understatement and excluded some of the costs for which Propellex admits responsibility (findings 55, 59).

Propellex's witnesses testified, and its expert contended, that Propellex did not segregate and record, and could not estimate, the labor hours and costs of the black powder moisture investigation, which costs were commingled with all labor hours and costs of contract performance (finding 56), and so it could not prove its losses directly. However, Propellex's expert found no difficulty in approximating the costs under contract 817 of abnormal grinding and inspection on lots 6-7, of weighing primers for missing black powder charges and of "other overruns" on lots 6-9 not attributable to its black powder moisture investigation, and under contract 455 of weighing primers for missing black powder charges on lots 4-5 (finding 59). Further, in connection with its entitlement case, appellant documented its investigative efforts although it did not provide estimates of the cost of those efforts (finding 60). Such evidence does not establish the impracticability of proving Propellex's claimed losses directly.

Propellex's proof of the reasonableness of its bids on contract 817 and 455 was adequate, and the DCAA did not question the total costs Propellex incurred to perform those contracts (findings 57-58). The most serious failure of Propellex's modified total cost proof is that it did not exclude from the claim amounts, costs under both contracts 817 and 455 not attributable to black powder moisture investigation, including the costs to produce 5,202 MK 153 primers that Propellex included in its claimed \$1,857,053 "total cost of performance" under contract 817; to perform breakaway torque testing, scrapping and demilitarizing of 3,982 primers in lots 1-3, contract 455; to scrap and demilitarize 6,000 primers that Propellex itself rejected for excess moisture content under lot 1, contract 455; to scrap and demilitarize 261 primers; and for stock component vendor problems under contract 455, lot 5 (finding 61). The Board attempted to reconstruct from the record a reasonable approximation of those costs, but found that the evidence does not permit such an approximation because of the presence of certain primer costs that are irreconcilable with Propellex's claimed "total cost of performance" and with the DCAA audit work papers, and the absence of hourly labor and material costs incurred under the affected primer lots and needed for such approximation, that are free of black powder moisture investigation costs (finding 62).

We hold that Propellex failed to establish two of the four required elements of proof of a modified total cost recovery.

The "two prerequisites to application of the Eichleay formula to recover unabsorbed overhead [caused by government delay] are: (1) that the contractor be on standby and (2) that the contractor be unable to take on other work." *Interstate Gen. Gov't Contractors, Inc. v. West*, 12 F.3d 1053, 1056 (Fed. Cir. 1993), quoted in *Charles G. Williams Const., Inc. v. White*, No. 01-1074, slip op. at 5 (Fed. Cir. Nov. 8, 2001). The second prong—the contractor's inability to take on outside work—requires "the government to demonstrate that it was not impractical for the contractor to take on replacement work and thus avoid the loss." (*Id.*) Propellex did not establish that the Government disrupted, delayed or suspended its work and that it was on "standby" from 31 March to 30 June 1992. During that period Propellex performed breakaway torque testing, reworked, produced and delivered 56,489 primers in lots 1-4 under contract 455 (finding 63). We also found that Propellex's testing and rework of defective primers was a contributory cause of any delay or suspension of contract 455 during the period 31 March to 30 June 1992 (finding 63). We hold that Propellex is not entitled to recover "Eichleay" unabsorbed overhead costs.

Costs of preparing a claim incurred before and even after its submission, with the genuine objective of furthering negotiations with the contracting officer, are allowable under either FAR 31.205-30(d) or 31.205-47(f). See *Bill Strong Enterprises, Inc. v. Shannon*, 49 F.3d 1541, 1550 (Fed. Cir. 1995); *Grumman Aerospace Corp.*, ASBCA No. 50090, 01-1 BCA ¶ 31,316 at 154,673. Propellex's 27 December 1993 claims lacked proper CDA certifications (finding 52). Propellex's 16 September 1994 claim was properly certified (finding 53). Propellex claimed \$42,163 in claim preparation costs

including \$25,497 in attorney fees incurred from January to 16 September 1994, and \$16,666 for in-house costs of its controller and vice president in 1994 (finding 64). On 14 February 1996 the CO met to negotiate a settlement of Propellex's claim, offered \$77,325 in settlement (finding 54). Therefore, Propellex can be said to have incurred the claim preparation costs for the purpose of materially furthering the negotiation process, which is a cost of contract administration. See *Bill Strong, supra*. Accordingly, Propellex's \$25,497 for claim preparation costs are allowable and recoverable, but the \$16,666 in-house costs are unallowable, because of the absence of proof that such costs were not included in overhead (finding 64).

We hold that Propellex is entitled to recover 1993 consultant fees and costs in the amount of \$6,921 (finding 58) with 10% of profit thereon (\$692), and its 1994 attorney fees in the amount of \$25,497 (finding 64), together with CDA interest on the \$33,110 total from 21 September 1994 (finding 53) until the date of payment thereof. We sustain the appeal to the extent set forth above, and deny the balance.

Dated: 27 December 2001

DAVID W. JAMES, JR.
Administrative Judge
Armed Services Board
of Contract Appeals

(Signatures continued)

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. 50203, Appeal of Propellex Corporation, rendered in conformance with the Board's Charter.

Dated:

EDWARD S. ADAMKEWICZ
Recorder, Armed Services
Board of Contract Appeals