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## Corrected Version

Appeal of -- )  
 )  
The Clark Construction Group, Inc. ) CAB No. 2003-1  
 )  
Under Contract No. AOC-9800017 )

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# TABLE OF CONTENTS

<b>I. BACKGROUND</b>	<b>1</b>
A. Summary of Project	1
B. Relationship of Parties	6
C. Claim and Appeal	8
D. Outline of Decision	10
<b>II. PALM HOUSE DESIGN AND COORDINATION RESPONSIBILITIES</b>	<b>10</b>
<b>III. CRITICAL PATH DELAY OF CONTRACT</b>	<b>19</b>
A. Applicable Law for Critical Path Delay	19
B. CPM Schedule Under Contract	23
C. Summary of Critical Path Delay Analysis Methodology	24
D. Parties' Scheduling Experts' Conclusions	26
E. Credibility of Scheduling Experts	30
<b>IV. CRITICAL PATH DELAY ANALYSIS</b>	<b>31</b>
A. Period 1	31
1. Subperiod 1A	31
a. Summary of Subperiod 1A	31
b. Clark Contentions	34
c. Geometry Issues	34
d. Other Geometry Related Design Defects	39
e. Palm House Column Splice Plate Hole Locations	41
f. One-Inch AC Truss Plates Into Three-Eighths Inch BB Truss Space	43
g. Flattened Angle	43
h. Comparison of Experts' Testimony	47
2. Alleged Manipulation of CPM Schedule	51
3. Sub-Period 1B	55
4. Sub-Period 1C	56
5. Period 1 Conclusion	56
B. Period 2	57
1. Summary of Period 2	57
2. Clark's Contentions and AOC's Response	58
3. Palm House Level 3 and 4 Catwalks	59
4. Other Structural Design Issues	66
5. Palm House Column Splice Plate Holes	74
6. Other Possible Reasons For Delay	76
7. Unrealistic Duration for Activity	78
8. Period 2 Conclusion	79
C. Period 3	79
1. Summary of Period 3	79
2. Clark's Contentions	81
3. Monitor Bolt-Holes	82
4. Delays due to Late Fabrication of the Palm House/Garden Court Expansion Joint, Vestibules, Crickets and Curved Member at Lean-To	83
5. Alignment of the Monitor	88
6. Comparison of Experts' Testimony	89
7. Period 3 Conclusion	91

D. Period 4-----	91
1. Summary of Period 4 -----	91
2. Clark's and AOC's Contentions-----	96
3. Did Clark Act as a Volunteer?-----	97
4. Lacing Angle Repairs-----	98
5. Other Palm House Structural Repairs-----	99
a. Intermediate Tension Ring Repairs-----	99
b. Ridge Truss Repairs -----	102
6. Other Structural Issues -----	103
7. Comparison of Scheduling Experts' Opinions -----	104
8. Period 4 Conclusion-----	106
E. Period 5-----	106
1. Summary of Period 5 -----	106
2. Comparison of Experts' Testimony-----	107
3. Period 5 Conclusion-----	109
F. Summary of Total Critical Path Delay-----	109
V. NON-CRITICAL PATH DELAY -----	110
VI. LIQUIDATED DAMAGES-----	111
VII. ACCELERATION DAMAGES -----	113
VIII. CLARK'S SUBMITTED CLAIM-----	119
IX. THE LEGAL FRAMEWORK OF EQUITABLE ADJUSTMENT CLAIMS-----	122
X. NO DAMAGES FOR DELAY CLAUSE-----	125
XI. CLARK'S CLAIMS ON OWN BEHALF -----	127
A. Home Office Overhead-----	127
B. Profit -----	128
C. Proposal Preparation Costs -----	130
D. Excess General Conditions Delay Claim -----	132
E. Acceleration Claim-----	135
F. Excess Design Costs -----	140
G. Excess Scheduling Consultant Costs -----	141
H. Mansfield Company Engineering Support, Clark Change Order No. 810348. -----	144
I. Palm House Structural Aluminum Repairs, Clark Change Order No. 810298 -----	146
J. Garden Court Pool Revisions, Clark Change Order No. 810191 -----	150
K. East and West Display Hall Access Panels, Clark Change Order No. 810337 -----	159
L. Palm House Level 4 Light Mounting Brackets, Clark Change Order No. 810340-----	160
M. Infill at Radiator Cabinets, Clark Change Order No. 810303-----	162
N. Capital Refinishers Storage Costs, Clark Change Order No. 810075 -----	163
O. Traffic Requirements at Independence Avenue, Clark Change Order No. 810261 -----	165
P. Unilateral Deduct for PEPCO Payment, Clark Change Order No. 810415-----	167
XII. CLARK CONCRETE'S CLAIMS -----	169
A. Delay Claim-----	169
B. Clark Concrete Change Claims -----	173
XIII. JUDD'S CLAIMS -----	174
A. Delay/Acceleration Claim-----	174
B. PEPCO Duct Bank Issues, Clark Change Order No. 810266 -----	178
C. Starters and Disconnects, Clark Change Order No. 810233 -----	182
XIV. STANDARD IRON'S CLAIMS -----	185
A. Standard Iron Delay Claim -----	185
B. Standard Iron Acceleration Claim-----	186
C. Williams Steel Delay Claims -----	190

D. Williams Steel Acceleration Claim-----	192
E. Standard Iron's Additional Engineering, Clark Change Order No. 810421-----	193
F. Palm House/Garden Court Expansion Joint Change, Clark Change Order No. 810238-----	195
G. East and West Transition House Change, Clark Change Order No. 810133-----	198
H. Palm House Wall Purlins, Clark Change Order No. 810302.-----	200
I. Revisions to Orangerie Monitor Steel Structures, Clark Change Order No. 810186-----	202
J. Orangerie Monitor Roof Steel Revision; Clark Change Order No. 810260-----	204
K. Palm House Vestibules, Clark Change Order No. 810163-----	205
L. Palm House Maintenance Level Catwalk, Clark Change Order No. 810117.-----	207
M. Monitor Bolt-Holes, Clark Change Order No. 810213-----	208
N. Palm House Lean-To Dimension Change, Clark Change Order No. 810165-----	212
O. Change to Steel Supports at Sliding Doors in Palm House; Clark Change Order No. 810408-----	213
P. Garden Court South Wall Finned Tube Radiation Support, Clark Change Order No. 810401-----	215
<b>XV. ROUGH BROTHERS' CLAIMS-----</b>	<b>218</b>
A. Delay Claims-----	218
1. Design and Engineering Delay-----	218
2. Palm House Delay-----	224
B. Acceleration Claims-----	225
C. Claim Preparation Costs-----	226
D. Additional BOCA Purlins, Clark Change Order No. 810028-----	227
E. In-Swing Vents, Clark Change Order No. 810042-----	232
F. Monitor Gutter Clips, Clark Change Order No. 810323-----	235
G. Corner House Finned Tube Radiation Support, Clark Change Order No. 810300-----	237
<b>XVI. KIRLIN'S CLAIMS-----</b>	<b>238</b>
A. Acceleration Claim-----	238
B. Delay Claim-----	241
C. United Sheet Metal Acceleration Claim-----	244
D. Kirlin Change Claims-----	245
E. Revised Fogging System, Clark Change Order No. 810214-----	249
F. P100 Revisions, Clark Change Order No. 810040-----	266
G. Resize Fans for Air Handling Units, Clark Change Order No. 810150-----	279
H. Palm House Finned Tube Rerouting, Clark Change Order No. 810324.-----	286
I. Wall Hydrants at Orangerie Roof, Clark Change Order No. 810111-----	287
J. Extended Steam Piping, Clark Change Order No. 810384-----	292
K. Rain Leaders in Palm House, Clark Change Order No. 810400-----	295
L. South Addition Ceiling Heights---Mechanical, Electrical, & Plumbing (MEP), Clark Change Order No. 810377-----	298
M. AHU No. 14 Changes, Clark Change Order No. 810383-----	300
N. Addition of Pool Water Level Controls, Clark Change Order No. 810094-----	302
O. Revise Mezzanine Mechanical Room, Clark Change Order No. 810083-----	307
P. Relocate Fire and Water Service, Clark Change Order No. 810346-----	309
Q. Water Meter Vault Relocation, Clark Change Order No. 810376-----	311
<b>XVII. KALOS' CLAIMS-----</b>	<b>313</b>
A. Delay Claim-----	313
B. Acceleration Claim-----	314
C. Backfill at Glass Houses and Courtyard, Clark Change Order No. 810059-----	317
<b>XVIII. MEGACO'S CLAIMS-----</b>	<b>320</b>
A. Acceleration Claim-----	320

B. Delay Claims-----	321
C. Brick Replacement, Clark Change Order No. 810093-----	323
D. Additional Drywall Painting in South Addition, Clark Change Order No. 810365 -----	327
E. Additional Painting in South Addition Basement, Clark Change Order No. 810313 ---	328
F. Credit for Purlin Painting, Clark Change Order No. 810089. -----	330
G. Door Punchlist Painting, Clark Change Order No. 810427 -----	331
<b>XIX. LORTON'S CLAIMS-----</b>	<b>332</b>
A. Delay Claims -----	332
B. Acceleration Claim-----	333
C. Interior Garden Court Flagstone, Clark Change Order No. 810387-----	334
D. Monumental Door Closures/Threshold, Clark Change Order No. 810196 -----	337
<b>XX. RIDGEVIEW'S CLAIMS-----</b>	<b>345</b>
A. Delay Claims -----	345
B. Acceleration Claim-----	351
<b>XXI. TG CONSTRUCTION'S CLAIMS -----</b>	<b>352</b>
A. Delay Claims -----	352
B. Acceleration Claims-----	354
<b>XXII. RENTOKIL'S CLAIM-----</b>	<b>356</b>
A. Extra Plant Storage Costs, Clark Change Order No. 810391-----	356
<b>XXIII. COMMERCIAL ROOFING'S CLAIM -----</b>	<b>356</b>
A. Step Flashing at East and West Connecting Houses, Clark Change Order No. 810329--	356
<b>XXIV. CONCLUSION-----</b>	<b>358</b>

## DECISION

The Clark Construction Group, Inc. (Clark or Appellant) appeals the decision of the Architect of the Capitol (AOC, Government or Respondent) denying its claims and seeks \$12,406,250 in damages arising out of alleged delay, acceleration and changes to its contract No. 9800017 for the renovation of the United States Botanic Garden Conservatory. This Board's jurisdiction of this appeal is pursuant to the Disputes Clause in the contract and the appointment of the Board by the Joint Committee on the Library by letter dated December 13, 2002.<sup>1</sup> A hearing was held on both entitlement and quantum pursuant to the rules established by the Board.<sup>2</sup>

We sustain the appeal, in part.

### I. BACKGROUND

#### **A. Summary of Project**

The Botanic Garden is essentially a living plant museum, established by the Congress in 1820 and administered by AOC since 1934. It is located in Washington D.C. at the east end of the National Mall, immediately west of the United States Capitol. Under the direction of the Joint Committee on the Library, which has authority over the Botanic Garden, AOC is responsible for its maintenance and operation as well as for any construction, changes, or improvements.

The conservatory was first constructed in 1931 pursuant to a design prepared by the Lord & Burnham Co. C4 Supp. 08 0189. The centerpiece of the Botanic Garden is the "Palm House," which has been described as follows:

Originally constructed in the early 1930s, the Palm House at the United States Botanic Garden comprises the central conservatory structure with lean-to sections. The central conservatory is approximately 80 ft tall, 68 ft wide (east-west orientation), and 97 ft long (north-south orientation) with 45° chamfered corner. The lean-to sections extend approximately 15 ft to the east and the west of the central conservatory and are about 38 ft tall.

C4 Supp. 08 00189.

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<sup>1</sup> This appeal is not subject to the Contract Disputes Act of 1978, 41 U.S.C. §§ 601 *et. seq.* (2000), which is not applicable to legislative agencies, including AOC. According to the terms of the Disputes clause included in this contract, the decision here is final and conclusive on questions of fact arising under the contract unless fraudulent, capricious, arbitrary, so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. R4, K0039.

<sup>2</sup> References to the evidence will be as follows: Rule 4 file: "R4"; Clark's supplemental Rule 4 file: "C4 Supp."; AOC's supplemental Rule 4 file: "A4 Supp."; Clark's hearing exhibits: "App. Exh."; AOC's hearing exhibits: "Resp. Exh."; hearing transcripts: "H.Tr., (witness's name);" deposition transcripts: "D.Tr., (deponent's name);" Appellant's Proposed Findings of Fact and Conclusions of Law: "App. PFF"; Respondent's Proposed Findings of Fact: "Resp. PFF"; Contracting Officer's Decision: "COD"; and Appellant's Request for Equitable Adjustment: "REA".

In addition to the aluminum and glass Palm House, other major structural features of the original Botanic Garden include the limestone Orangerie (the north-most section of the facility and its public entrance), the brick and glass Garden Court (located south of the Orangerie and north of the Palm House), the limestone East and West Display Halls (located at the northeast and northwest corners of the Botanic Garden), two outdoor garden areas (located on the east and west sides of the Palm House), and glass low houses and corner houses (comprising the east, west, and south-most perimeter sections of the facility).

By the 1990s, however, the Botanic Garden had fallen into substantial disrepair. In 1992, AOC closed a major portion of the Botanic Garden as a result of concern with the safety of the structure due to deterioration of the aluminum supporting the glass portions of the Palm House conservatory in which the majority of the plants were located. Resp. PFF, part 1, at 1. The Palm House was dismantled after its closure: the top three-quarters of the structure was severed at a point just above the 20 existing steel lattice columns which formed its perimeter and the arch trusses were removed. App. PFF ¶ 9. The entire Botanic Garden was closed to the public in 1997. *Id.*

AOC, in the early 1990s, began to give thought to restoring the Botanic Garden. In 1993, AOC entered into a contract with Daniel, Mann, Johnson & Mendenhall (DMJM) to provide architectural consulting and design services and to develop plans and specifications for a Botanic Garden renovation project. C4 Supp. 14 0002-0138; H.Tr., Krapp, 29:31-32. The plans and specifications developed by DMJM eventually became the government requirements for the Botanic Garden renovation contract, which is the subject of this appeal.

On April 13, 1998, AOC issued a request for proposals (RFP) for the renovation of the Botanic Garden. A site visit and pre-proposal conference were held shortly thereafter. While the specific performance requirements are discussed in greater detail below, the RFP's general scope of work included:

- the renovation of Orangerie, Garden Court, and East and West Display Halls
- the construction of a new 11,500 square foot limestone addition, south of the existing low houses (the "South Addition")<sup>3</sup>
- the historical reconstruction of the Palm House and other conservatory glass houses
- the performance of lead paint and asbestos abatement programs
- the addition of four catwalks, a glass elevator and an automated glass pane venting system for climate control within the Palm House
- the addition of an automated environmental control system (consisting of a sun shading system, fogging system, air-conditioning system and controls) for the entire Botanic Garden

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<sup>3</sup> The South Addition and its basement were to house equipment rooms for the newly automated environmental control system, mechanical and electrical equipment, administrative offices, restrooms, and storage areas.

- the installation of “hardscape” (*i.e.*, faux and natural rocks and trees, limestone terraces and staircases, water features and pools) and landscape throughout the Botanic Garden.

See R4, K0076-77.

On or about July 13, 1998, Clark and the other competitors submitted their technical and price proposals (*i.e.*, “near final offer”). On August 10, 1998, AOC issued amendment No. 9 to the solicitation, informing Clark and other offerors within the “competitive range” that the closing date for submission of “best and final offers” was August 21, 1998. This amendment also included attachment 4, which substantially amended the conservatory glass requirements. Specifically, the amendment provided that “the conservatory glass size shall replicate the existing glass size, in lieu of the larger glass size indicated on the contract drawings.” R4, K1847. This amendment also deleted the requirement for a high pressure fogging system and substituted a requirement for a low pressure fogging system. R4, K1758, 1848.

On October 1, 1998, after receiving and evaluating best and final offers, AOC awarded Clark a fixed-price contract in the amount of \$27,920,520 for the renovation of the Botanic Garden. The contract contained some but not all the Federal Acquisition Regulation (FAR) clauses commonly found in government construction contracts.<sup>4</sup> Some of the specific contract provisions and specification requirements found relevant to this appeal are appended to the decision. See Appendix 1. The contract completion date was stated to be September 5, 2000. R4, K0054.

Clark did not plan to perform all or even the majority of the renovation contract itself. Rather, Clark’s plan for contract performance was largely to limit its own work to that of a general contractor and to utilize subcontractors for the various trade functions. The major subcontractors employed by Clark for the renovation contract were:

Subcontractor	Nature of Work
Clark Concrete Contractors, Inc. <sup>5</sup>	Concrete foundations
A. Judd Electrical Construction Co., Inc.	Electrical
Standard Iron, Inc.	Metal Fabrication and Erection
Rough Brothers, Inc.	Conservatory Glazing System
John J. Kirlin, Inc.	Mechanical, Plumbing
Kalos Construction, Inc.	Excavation, Fill, Piping, Sewer Systems
Megaco Inc.	Abatement, Painting, Brick Replacement
Lorton Contracting Company, Inc.	Stone
Ridgeview Glass, Inc.	Windows, Doors
TG Construction, Inc.	Exhibits
Rentokil Inc.	Plants

<sup>4</sup> AOC, as a legislative agency, is not subject to the FAR.

<sup>5</sup> Clark Concrete Contractors, Inc. is a wholly owned subsidiary of the Appellant, Clark Construction Group, Inc.

This appeal has focused primarily on the design, fabrication, and erection of the Palm House. The contract contained a mix of design and performance specifications with respect to the Palm House, where the aluminum and steel structure was to be fabricated and erected in accordance with a design specification and the glazing system was to be fabricated and installed in accordance with a performance specification.<sup>6</sup> The interplay of these specifications is at the heart of many of the disputes of this appeal. As discussed below, during the course of the contract, both parties took extreme positions in their interpretation of these specifications, with AOC at one time essentially arguing that Clark had been given the entire responsibility to design all aspects of the Palm House and Clark arguing that certain elements that we find were part of the performance specification should have been AOC's responsibility under the contract's design specification.

The preparation of the shop drawings for, and the fabrication and erection of, the Palm House aluminum structure in accordance with the contract's design specifications were the responsibility of Clark and its subcontractor, Standard Iron. This work, the most time critical work on the project, was not scheduled by Clark to commence until February 1, 1999. Resp. Exh. 53. In this regard, this work represented the first part of the critical path of the project; that is, these were the first activities that had to be timely completed in order for the project to be completed by the required completion date.

The contract, in particular the Palm House activities, almost immediately fell behind schedule. By October 8, 1999, the contract was 130 calendar days behind schedule, and, by April 19, 2000, when Standard Iron began erecting the Palm House aluminum and steel structure, the contract was already 274 calendar days behind schedule. App. Exh. 92 at 4. While Clark contends that this delay was exclusively caused by design defects in the AOC/DMJM drawings, AOC contends that it was caused by inefficient work by Clark and its subcontractors. As discussed below, we find that the vast majority of this delay was Clark's responsibility.

Beginning in December 1999, the parties met to determine whether contract performance could be improved or accelerated. H.Tr., Sullivan, 13:47-53. While these discussions did not culminate in any formal agreements, on April 6, 2000, AOC directed that all areas of the project, except the Palm House, be made suitable for provisional use by December 30, 2000 and that the rest of contract be completed by March 31, 2001. C4 Supp. 22 1711-12. In response to this direction, Clark's issued various acceleration orders to its subcontractors. *See, e.g.*, R4, 5657-72.

Clark requested various time extensions to the contract, culminating on July 6, 2000 in a request for a 277-work day extension (approximately 388 calendar days) because of alleged design defects of the Palm House aluminum structure. C4 Supp. 22 2727. This request was denied in total by AOC on July 20. R4, LTR 2356. However, by change order No. 132, on September 11, 2000 (shortly after the original contract completion date), AOC granted a time extension to Clark. This letter stated:

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<sup>6</sup> As described in more detail below, design specifications describe precisely the materials to be employed and the manner in which the work is to be performed, while performance specifications leave to the contractor's discretion, skill and ingenuity the details of performance.

By this letter I am extending the completion dates of the projects as follows:

1. All areas of the project, except the Palm House, are to be complete for provisional use by December 30, 2000.
2. All contract work shall be completed by March 31, 2001.

Determination of any compensation associated with the above time extension will be the subject of future discussions and correspondence.

Resp. Exh. 94. Thus, on September 11, 2000, AOC granted Clark a 207-calendar-day contract extension from September 5, 2000 to March 31, 2001, *see* App. Exh. 92 at 28, but AOC did not determine that this delay was compensable. Resp. Exh. 94.

Meanwhile, work continued throughout the project. For example, Standard Iron installed the Palm House aluminum and steel structure, and Rough Brothers began the installation of its glazing system. These critical path activities continued, with somewhat less contract delay, until December 2000. App. Exh. 92 at 22.

The Palm House work was not the only problematic work on the project. Specifically, early in the contract, AOC increased the scope of work for the lead abatement procedures and delayed its approval of Clark's submittals for performing the procedure, which ultimately required Clark to resequence its work activities.<sup>7</sup> H.Tr., Sullivan, 12:195-202. There were also two major changes to the work of Kirlin, the mechanical and plumbing subcontractor: (1) the P100 change, which significantly changed the underground piping, and (2) a change in the required fogging system. There was also a major change to the shade cloth system, which was one of the elements of the glazing system (the deletion of the specified shade cloth system is the subject of our decision issued today in CAB No. 2003-2). In addition, Clark's electrical subcontractor, Judd, was unable to provide adequate personnel to complete the project and Clark contracted with Truland Systems Corporation to supplement Judd's work force and to complete the electrical work on the project.

In December 2000, Clark ceased work on the Palm House when a design error was discovered in the lacing angles of the Palm House trusses. App. Exh. 92 at 23. At that time, Clark contracted with the engineering firm of Simpson, Gumpertz & Heger, Inc (SGH) to review the design of the rest of the Palm House. SGH's review identified other design issues (some of which AOC asserts resulted in unnecessary repairs to the Palm House), which Clark addressed between December 2000 and April 2001. *Id.* at 23-24. Meanwhile, work in this area was virtually suspended while Clark made repairs to address these design issues. *Id.* By April 10, 2001, the project had been delayed by 421 days. *Id.* at 4.

In the midst of this suspension, on February 5, 2001, AOC sent a "cure notice" to Clark, indicating that the contract may be terminated for default if Clark did not remedy a variety of

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<sup>7</sup> There is no specific Clark claim based on this resequencing.

problems, including its failure to make adequate progress under the contract and various Palm House structural problems. App. Exh. 52.

By April 2001, the repairs to the Palm House were completed. Thereafter, the work on the entire project was accelerated until the contract was considered substantially complete on August 31, 2001. This represents a 360-calendar delay from the original September 5, 2000 completion date. H.Tr., Kern, 21:98-99.

### **B. Relationship of Parties**

As indicated, the contract quickly fell behind schedule and numerous change requests were submitted, which led to an increasingly adversarial relationship among the parties. The record also evidences an increasingly strained relationship between DMJM and AOC with regard to the quality of the design and the timeliness of AOC's review of submittals. We find that none of the parties (AOC, DMJM or Clark) were without fault in the performance of this contract.

For example, the record contains numerous instances of AOC failing to timely review and approve Clark's submittals or process Clark's claim requests, and development of the common practice by DMJM of providing "bootleg" design responses to Clark because of AOC's delays. *See e.g.*, H.Tr., Brainerd, 28:67, 75; C4 Supp. 10 0759. Moreover, as we find below, AOC unreasonably took the position that amendment No. 9, attachment 4 transferred much of the design responsibility for the Palm House to Clark and took untenable positions on various other disputes over change claims.

Finally, as noted by the Appellant, a DMJM representative in a memorandum to an AOC official referred to "mismanagement of the original AOC management team," that "neither could or would make a decision or provide a timely response, [which] provided Clark with an opportunity to explore delay claims for whatever issue they wanted," and that the "relationship between Clark and AOC was bitter at best and distrust on the part of both sides was strong." C4 Supp. 10 0759.

The record also contains evidence of numerous instances of Clark and its subcontractors failing to provide adequate support for contract extensions and requests for equitable adjustment, and often submitting inflated claim requests, which it later had to significantly lower. Moreover, as discussed in detail below, notwithstanding Clark's persistent assertions throughout the contract that the project delay was entirely caused by AOC/DMJM's design defects, we found that the vast majority of the contract delay was Clark's responsibility. Also, although Clark's subcontractors performed the bulk of the project work, the record evidences that Clark did not properly coordinate its subcontractors' work as required by the contract. The record also shows that there were performance issues with regard to at least two of Clark's subcontractors, Standard Iron (whose performance caused the bulk of the contract delay) and Judd (which did not adequately staff the project) that adversely affected the progress of the project. Moreover, AOC asserted that after contract award, Clark replaced some of the personnel offered in its proposal with less qualified personnel, one of which was only replaced after a year of complaints by AOC. COD, ch. 2, at 5.

Finally, the same DMJM representative, whose opinion Clark cited above to show that AOC was assertedly mismanaging the contract, also stated that Clark and its subcontractors had not been providing adequate manpower for the project, that Clark's efforts to mitigate delays in the field were "insignificant and really only a show," and that the upper management of Clark "finally realized that this project has been a 'Clark rudderless ship.'"<sup>8</sup> C4 Supp. 10 0760.

With regard to DMJM, the record contains considerable evidence of incomplete or erroneous designs. Many of these designs resulted in claims decided under this appeal. In fact, as discussed below, DMJM's significant design error in the lacing angle in the Palm House trusses brought the project to a halt for several months. Forrest Mansfield, an expert in civil engineering (H.Tr., Mansfield, 1:89-90), persuasively testified that DMJM's drawings were incomplete, and that "they're lacking perhaps the last 20 percent of devotion that comes from senior designers overseeing the groups that are the draftsmen and junior designers that are under them." H.Tr., Mansfield, 11:254-55.

In arguing that AOC recognized the contract was delayed because of DMJM's defective designs, Clark points to a letter from the Architect of the Capitol, Alan Hantman on April 3, 2000, in response to a letter from the Chairman of the Committee on Appropriations of the House of Representatives expressing concern about the delay in constructing the project, C4 Supp. 10 0286, where the Architect attributed some (but not all) of the problems to DMJM, which he stated "provided many drawings that were seriously flawed, and did not respond expeditiously to our requests for redesign." C4 Supp. 10 0370-71. Mr. Hantman stated in this letter that he elected not to consider terminating DMJM's contract for default because this would cause additional delays and cost to the project, and that AOC would pursue any viable claims against DMJM. *Id.* Mr. Hantman also noted that Clark had put AOC on notice that it would pursue claims for additional money and time as a result of delays, and that AOC intended "to vigorously defend the government's rights in these issues and to minimize the impacts on the project." *Id.*

Finally, the record contains numerous examples of a lack of communication and cooperation between the parties, who often took extreme or untenable positions apparently without discussing the matter with the other party, which enhanced an adversarial and distrustful atmosphere. Good contract administration depends upon the development of mutual confidence and respect between the government and contractor officials, and both parties have a duty to cooperate and act in good faith during contract administration. John Cibinic, Jr. & Ralph C. Nash, *Administration of Government Contracts*, (3d ed. 1995), at 2-7. While we are not prepared to conclude that either party acted in bad faith, the lack of mutual confidence and respect caused and exacerbated many of the disputes raised in this appeal.

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<sup>8</sup> We assume that since Clark indicates that we should give weight to this DMJM representative's opinion that AOC mismanaged the project because Alan Hantman, the Architect of the Capitol and AOC's contracting officer, considered him to be a "very competent individual," App. PFF ¶ 5, n.3, *citing* D.Tr., Hantman, 22, Clark would concede that we should give no less weight to his opinion that this project was perceived to be a "Clark rudderless ship."

### C. Claim and Appeal

As indicated, the original contract award amount was \$27,920,520. Many change orders were executed during the course of the contract, which increased the amount Clark had been paid under the contract as of May 16, 2002 to \$28,522,276. REA Narrative at 29. On May 16, 2002, Appellant requested a contracting officer's decision on its claim of \$22,614,659.<sup>9</sup> *Id.* The contracting officer's decision, which is the subject of this decision, signed by Mr. Hantman and issued August 1, 2002, denied the bulk of Clark's claim.<sup>10</sup> The contracting officer determined that Clark was entitled to additional compensation in the amount of \$200,045 for the disputed change orders and \$59,176 for necessary remedial work for lacing angle repairs. However, the contracting officer's decision also assessed Clark \$178,500 in liquidated damages and \$225,090 for Clark's asserted failure to provide the Project Executive it had promised in its proposal. COD, part 5. We understand that no payments were made to Clark based on the final contracting officer's decision.

On November 4, 2002, Clark appealed the contracting officer's decision (except for AOC's assessment of \$225,090 for Clark's failure to provide a project executive, which was not

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<sup>9</sup> Subsequently, Appellant requested that the issue concerning the deletion of the shade cloth system be severed and be the subject of a separate contracting officer's decision; this caused Clark's claim to be reduced to \$21,593,689. The deletion of the shade cloth system claim was the subject of subsequent contracting officer's decisions and appeal to the Board, which we have decided today under Contract Appeals Board No. 2003-2.

<sup>10</sup> Clark attacks AOC's defense of this appeal on the basis that Mr. Hantman did not write the contracting officer's decision, and displayed little personal knowledge in his deposition regarding various aspects of its contents or of other key information on which it was based. App. PFF ¶¶ 1-4. In rendering the contracting officer's decision, Mr. Hantman testified that he relied upon the advice of his legal counsel, experts and project personnel. D.Tr., Hantman, 19, 33, 40-41, 83, 113-14. The established rule is that a contracting officer must fully consider the issues before him and make up his own mind regarding the issues; however, a contracting officer is not required to isolate himself or herself and refuse to obtain guidance and advice from others. *BAE Sys. Information & Elec. Sys. Integration, Inc.*, ASBCA No. 448932, June 29, 2001, 01-2 BCA ¶ 31,495 at 155,525; see *J.A. Terteling & Sons, Inc. v. United States*, 182 Ct. Cl. 691, 694, 390 F.2d 926 (1968). There is also no requirement that the contracting officer independently investigate the facts of a claim nor is there any rule that he cannot rely on his subordinates in arriving at his final decision. *BAE Sys. Information & Elec. Sys. Integration, Inc.*, *supra*; *Prism Constr. Company*, ASBCA No. 44682 *et al.*, March 20, 1997, 97-1 BCA ¶ 28,909; at 144,125. Here, we find, based on our review of the record, that Mr. Hantman consulted with his advisors and exercised his independent judgment in making his final contracting officer's decision. In any case, while the contracting officer's decision is evidence that we have considered, we have accorded it no deference here, but our review has been *de novo*. See *Wilner v. United States*, 24 F.3d 1397, 1401-03 (Fed. Cir. 1994) (involving Contract Disputes Act claim). In this regard, on many of the claims of this appeal, Appellant has changed the claimed amounts as well as the theories for recovery, and presented evidence not considered by the contracting officer in rendering his decision, and Respondent has similarly changed theories and presented evidence not mentioned or considered in the contracting officer's decision. The Board has weighed the evidence presented and made our own *de novo* determination with respect to the claims presented in this appeal.

mentioned in Clark's appeal). The total amount sought in the appeal was \$20,365,551. A4 Supp. R00637 at 4.

The Board was appointed by the Joint Committee of Congress on December 3, 2002, and, pursuant to its appointment, issued rules on February 7, 2003. During the appeal, a number of claims were settled, some through the use of the Board's alternative dispute resolution (ADR) procedures,<sup>11</sup> and Clark withdrew some claims and AOC conceded some claims.<sup>12</sup> These settlements resulted in an adjusted contract price of \$30,026,553. App. Exh. 139. Clark also revised its claim several times during the hearing and by the end of the hearing had reduced its claim to \$12,406,250. *Id.* The claims still pending in this appeal are for delay and acceleration damages, and for requests for equitable adjustment for changed work on behalf of Clark and 16 of Clark's subcontractors, including Clark Concrete, Judd<sup>13</sup>, Standard Iron, Rough Brothers, Kirlin, Kalos, Megaco, Lorton Ridgeview, TG Construction, Rentokil, Commercial Roofing and Sheet Metal Co., Inc., David Allen Company, ARC Construction Services, Inc, Truland, and Livingston Fire Protection Inc.

The first status conference on this appeal was conducted on February 26, 2003. At the request of the parties, hearings on this appeal were scheduled and conducted on an extremely expedited basis, given the size and complexity of this claim. Specifically, in accordance with the parties' agreement, hearings on the appeal began on June 24, prior to the end of discovery, which was not completed until September 14. A total of 29 days of hearing were conducted in Washington, D.C., at which 35 different witnesses testified. The hearing concluded on October 16.

AOC submitted a voluminous, poorly organized, and duplicative Rule 4 file, which appeared to consist of a large portion of AOC's files pertaining to this project (many relevant to the issues raised in this appeal and many not).<sup>14</sup> Both Clark and AOC supplemented the Rule 4 file with numerous other documents (from the parties' own files as well as those obtained during discovery) that were not much better organized. In total, the documents comprising the Rule 4 file amount to 180 binders, 12 boxes of documents, and numerous design and shop drawings.<sup>15</sup>

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<sup>11</sup> The Board included a separate member, David A. Ashen, who was designated by the Joint Committee on the Library to provide ADR. As indicated, ADR was successful in resolving a number of the claims.

<sup>12</sup> It appears to the Board that many more of the change claims could similarly have been negotiated by the parties, perhaps with ADR assistance.

<sup>13</sup> Because Judd is out of business, Judd's claims are actually on behalf of Judd's surety, Employers Insurance of Wausau (Wausau). However, because Clark advanced Judd monies to complete this project, we understand that Wausau would have recovered sums due after Clark has recovered the amount it advanced. H.Tr., Dylus, 22:251. As indicated below, Judd did not recover under this appeal more than the sum Clark advanced.

<sup>14</sup> At the Board's request, the parties provided two copies of many documents for the Rule 4 file and its supplements. In some instances, however, the two sets of documents did not bear the same bates numbers.

<sup>15</sup> There were numerous disputes regarding the production of documents during discovery, which were the subject of written rulings by the Board, some of which have been attached to this decision. *See* Appendix 2.

In addition, during the hearings a total of 237 exhibits were admitted into evidence, 147 offered by Clark and 90 offered by AOC. Moreover, by the agreement of the parties, designated and cross-designated portions of 16 depositions, with attachments, obtained during discovery, were placed in the record.<sup>16</sup>

Given the voluminous and complicated nature of the record, the Board repeatedly admonished the parties of the necessity of preparing complete proposed findings of fact citing all facts necessary to support their respective cases and specifically citing those documents in the record that the parties wanted to Board to specifically consider. H.Tr., 12:7-8, 29:202-03. Moreover, the parties were admonished that it was expected that witness testimony would be generally anchored by documentary evidence in the record. *Id.* at 13:5-7. Unfortunately, neither party to this appeal prepared sufficiently complete findings of fact or adequately cited to relevant evidence in the record to adequately support their respective cases, which increased dramatically the difficulty borne by the Board in resolving this appeal.

#### **D. Outline of Decision**

While this appeal contains numerous claims, the primary focus is the 360-day delay in the completion of the contract that was assertedly caused by AOC's defective design of the Palm House structure. To properly consider this issue as well as various related issues raised in the numerous change claims, we first need to consider the parties' respective responsibilities concerning the design of Palm House and Clark's duty to coordinate its work. This is necessary because the contract contained both performance specifications and design specifications with regard to this work, because this work was affected by Clark's contractual duties to coordinate, and because the parties have staked out extreme opposed positions with regard to these issues.

We will then state the appropriate legal standards applicable to claims for delay damages and set forth the parties' respective positions with regard to which party was responsible for the delay. We discuss the critical path method (CPM) "windows analysis" that we have used to analyze the delay during the contract under which we divided the contract into five windows periods for purposes of analyzing the reasons for the contract delay. We discuss in detail each of the five windows to determine responsibility for contract delay. Based on this analysis, we discuss the repercussions of this analysis on the delay damage claims, the assessment of liquidated damages, and the acceleration damage claims. Finally, we resolve the numerous specific claims for equitable adjustment based on delay, acceleration, change, or constructive change made by Clark and its subcontractors.

## **II. PALM HOUSE DESIGN AND COORDINATION RESPONSIBILITIES**

During the project, the parties had significant disputes concerning their relative responsibilities with regard to the design and coordination of the project, particularly with regard to the Palm

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<sup>16</sup> The designated portions of the deposition of Steven Witt of Rough Brothers, who also appeared as a witness at the trial, was admitted into evidence, over Clark's objection, because of the limited availability of this witness on the day he testified, and Clark's declination of the offer to produce this witness for further examination. H.Tr., 19:298-300.

House aluminum and steel structure and the glazing system attached thereto.<sup>17</sup> This had a significant impact on this project because, as discussed below, the renovation of the Palm House was the critical path of the project.

Roughly stated, the Palm House renovation consisted of two parts: (1) the fabrication and erection of a structural aluminum superstructure in accordance with a government-provided design under section 05140 of the contract and (2) the design, fabrication, and installation of an aluminum glazing support framing system attached to the superstructure, which satisfies certain performance specifications under section 13123 of the contract. Here, Clark chose to engage different trades (subcontractors) to perform the fabrication and erection of the structural aluminum (Standard Iron) and the design, fabrication, and installation of the glazing support framing system (Rough Brothers). As explained below, it was Clark's responsibility under the contract to coordinate the performance of its subcontractors in accordance with the various design and performance requirements of the contract.

#### **A. Contract Section 05140**

Fabrication and erection of the structural aluminum superstructure was governed by section 05140 of the contract, which required Clark to perform this work in accordance with government-provided "drawings, including schedules, notes and details showing size and location of members, typical connections, and types of aluminum required." R4, K0480. Under this section, Clark was required to submit shop drawings with "complete details and schedules for fabrication and assembly of structural aluminum members, procedures and diagrams." R4, K0481. Clark was also to fabricate and assemble the structural aluminum in accordance with Aluminum Association Specifications and as indicated on "final shop drawings." R4, K0482. Clark was also required to erect the structural aluminum in the field at the lines and elevations indicated within specified tolerances. R4, K0483-84. Finally, the contract provided that section 05140 "does not include elements of the Conservatory described in section 13123." R4, K0480.

Thus, section 05140 is essentially a design specification. Design specifications "describe in precise detail the materials to be employed and the manner in which the work is to be performed." *Blake Constr. Co., Inc. v. United States*, 987 F.2d 743, 745 (Fed. Cir. 1993). When the government provides design specifications, such as section 05140, it impliedly warrants that conformance with the design specifications and drawings will result in satisfactory completion of the work. See *United States v. Spearin*, 248 U.S. 132, 136 (1918); *Stuyvesant Dredging Co. v. United States*, 834 F.2d 1576, 1582 (Fed. Cir. 1987); see *Hardwick Brothers Co. II v. United States*, 168 F.3d 1322 (Fed. Cir. 1998), 1998 U.S. App. LEXIS 34121 (unpublished). "Although Government-furnished plans need not be perfect, they must be adequate for the task or 'reasonably accurate.'" *John McShain, Inc. v. United States*, 188 Ct. Cl. 830, 833, 412 F.2d 1281, 1283 (1969).

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<sup>17</sup> As discussed below, there were similar issues regarding a number of asserted changes, for example, the provision of support for the finned tube radiation system.

As a general rule, where the government breaches its implied warranty of adequate design specifications, it is responsible for the contractor's extra costs in performing under the defective specifications. *See Aleutian Constructors v. United States*, 24 Cl. Ct. 372, 378 (1991). On the other hand, where the government provides design specifications and drawings, and the contractor persuades the government to change them in accordance with the contractor's ideas, the contractor assumes the risk that performance under its proposed specifications may be impossible. In general, the party that drafts, or changes, design specifications are responsible for losses suffered by the other party due to defects in the specifications. *Id.*, citing *Austin Co. v. United States*, 161 Ct. Cl. 76, 81 (1963), *cert. denied*, 375 U.S. 830 (1963).

### **B. Contract Section 13123**

The design, fabrication, and installation of the glazing support framing system was governed by section 13123 of the contract, which required the provision of a "custom heavy duty quality aluminum framed glass enclosed conservatory." R4, K0897. Pursuant to this section, Clark was required to provide (1) the design and fabrication of an extruded aluminum glazing support framing system (with a number of specified components, including the glass); (2) operable vents with related gears, shafts, bearings, structural support and ancillary operator equipment; (3) connections, brackets and tracks for maintenance access system equipment, including work stage/platform and rolling ladders; (4) shade cloth system; (5) finishing systems for all metalwork; (6) installation of entire system, including all ancillary connections, methods of attachment of equipment to the structure and incidental metalwork; (7) demolition and reinstallation of designated framing members for reuse, or as directed by the Architect; and (8) to price this work as an "institutional" conservatory, which the contract defined "as a building comprised of proprietary or custom extrusions normally found in museum quality displays, with an assumed useful life expectancy of more than 50 years." R4, K0897. Also, Clark was required to submit engineering design calculations prepared and certified by a professional engineer, "showing that framing members and all components meet specified design criteria herein." R4, K0901.

The fabrication and erection of "Structural Aluminum described in accordance with Section 05140" was specifically excluded from section 13123. R4, K0987. Various performance requirements for the glazing system were provided, including loading information (*e.g.*, snow and wind loads and thermal expansion), and materials were specified for various components, such as aluminum extrusions and glazing. R4, K0900. In addition, section 13123 required Clark to design and install the conservatory to meet or exceed the requirements of the 1993 BOCA National Building Code.<sup>18</sup> R4, K0899.

Where, as here with section 13123, performance details are left to the contractor's discretion, skill, and ingenuity (that is, only the end state, objective, or functional characteristics are specified), the specifications are said to be "performance" specifications. *See Blake Constr. Co, Inc. v. United States*, 987 F.2d at 745; *J.L. Simmons Co. v. United States*, 188 Ct.Cl. 684, 689, 412 F.2d 1360 (1969). The *Spearin* warranty does not apply in the case of performance specifications because the contractor is tasked with the general responsibility and risk for

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<sup>18</sup> BOCA is an acronym for Building Officials and Code Administration. H.Tr., O'Hanlon, 18:204.

achieving the stated characteristics; that is, the contractor is responsible for selecting the means and thus assumes a corresponding responsibility for that selection. *Stuyvesant Dredging Co. v. United States*, 834 F.2d at 1582; *Dewey Elecs. Corp. v. United States*, 803 F.2d 650, 658 (Fed.0001 Cir. 1986); *Trescon Corp.*, ENGBCA No. 5253, September 23, 1998, 88-3 BCA ¶ 21,163 at 106,832. Also, the government's retention of the right to approve shop drawings based upon performance specifications does not transfer to the government the responsibility and risk of performing to the specifications.<sup>19</sup> See, e.g., *Kordick & Son, Inc. v. United States*, 12 Cl. Ct. 662, 669 (1987). Only where the specifications call for performance that is impossible or commercially impracticable to achieve can a contractor obtain an equitable adjustment for defective performance specifications. *Concrete Placing Co. v. United States*, 25 Cl. Ct. 369, 374 (1992); *Intercontinental Mfg. Co., Inc. v. United States*, 4 Cl. Ct. 591, 595 (1984).

### C. Interplay of Sections 05140 and 13123

It is not uncommon in government contracts to have both design and performance requirements governing the contract work. *Blake Constr. Co. v. United States*, 987 F.2d at 746; *Aleutian Constructors v. United States*, 24 Cl. Ct. at 378; *Dillingham Constr., N.A., Inc. v. United States*, 33 Fed. Cl. 495, 501 (1995), *aff'd*, 91 F.3d 167 (Fed. Cir. 1996). Where specifications are a composite of design and performance requirements, the particular requirements that are the subject of the claim must be examined from a factual perspective as to whether the requirements arise from a design specification (for which the government is generally responsible) or from a performance specification (for which the contractor is generally responsible). See *Dewey Elecs. Corp. v. United States*, 803 F.2d at 658; *Fru-Con Constr. Corp. v. United States*, 42 Fed. Cl. 94, 96 (1998).

To determine whether a specification or portion thereof is a design specification or a performance specification, we will primarily look to the obligations imposed and discretion allowed by the specification. Specifically, specifications, or portions thereof, that provide detailed requirements directing the contractor as to how the work is to be accomplished and do not provide discretion to the contractor are regarded as design specifications, whereas specifications, or portions thereof, that provide the contractor discretion as to how to accomplish the work are at least to that extent regarded as performance specifications. *Blake Constr. Co.*, 987 F.2d at 746; *Dewey Elecs. Corp. v. United States*, 803 F.2d at 658; *Apollo Sheet Metal, Inc. v. United States*, 44 Fed. Cl. 210 (1999); *Fru-Con Constr. Corp. v. United States*, 42 Fed. Cl. at 96.

There has been no disagreement between the parties during this appeal that section 05140 is primarily a design specification, which placed the design responsibility for fabrication and erection of the structural aluminum upon the government. The parties also agree that

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<sup>19</sup> The contract here provided with respect to shop drawings that “[a]pproval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such submittals, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with Paragraph 7.4 below.” R4, K0034; see R4, K0105, (“approval shall not release the Contractor from responsibility to fulfill Contract Document requirements, unless otherwise provided in the Contract Documents”).

section 13123, which placed a design-build responsibility for the glazing and glazing support framing system upon Clark, is essentially a performance specification. In this regard, Clark has repeatedly noted that it always planned to provide, and did provide, a "glazing system [that was] custom tailored to fit to the structural aluminum design provided by the AOC." App. PFF ¶ 138. However, there is considerable disagreement concerning whether Clark or AOC was responsible for particular design elements, particularly those relating to interfaces of the glazing system with the structural aluminum or to structural details that were not shown on the contract drawings. To resolve each of these issues, we will analyze the relative responsibilities of the parties as defined by the contract.

#### **D. Amendment No. 9, Attachment 4**

As indicated above, prior to the submission of final proposals and award of the contract, AOC issued amendment No. 9, attachment 4, which amended the conservatory glass requirements in the contract. Specifically, this amendment provided that "the conservatory glass size shall replicate the existing glass size, in lieu of the larger glass size indicated on the contract drawings," and that the "conservatory framing system to match the existing glass size shall be designed by the Offeror in accordance with the requirements of Section 13123 and other related sections of the Project Manual and submitted to the Architect for approval." R4, K1847. This amendment was a "massive" change to the contract requirements, in that it changed the required size of the glass in the glazing system from four-foot square panels to two-foot square panels. H.Tr., O'Hanlon, 18:79-80. Among other requirements added by this amendment were the following:

1. Revision, as part of the submittal process, of the issued contract drawings for the roof plans and elevations to reflect the revised glass size;
2. An increase in the free area of the operable louvers/ventilation sashes (that is, the open area when the ventilation sashes are open) to match that originally shown on the contract drawings;
3. Replication of the existing glazing bar cap profile;
4. Provision of "all necessary supporting members for the revised glass size. Members shall be fabricated in accordance with the requirements of Sections 05140 and 13123."

R4, K1847.

There was much discussion by the parties during performance of the contract as to the affect of amendment No. 9, attachment 4 on the parties' respective responsibilities. At one point in contract performance, AOC essentially took the position that this amendment transferred to Clark some or all of AOC's and DMJM's responsibility for the design of the structural aluminum superstructure. For example, by letter of July 6, 2000, Clark requested a 277-work day extension of time to complete the contract because of the "incomplete nature of the palm house structural design." C4 Supp. 22 2727-28. AOC's construction manager, Joseph Metzler, responded on July 20, 2000, denying Clark's time extension request stating:

Attachment No. 4 to Amendment No. 9 requires you to provide the necessary design work associated with the conservatory system. The issues you have raised fall under this section of your contract.

R4, LTR 2356.

In his deposition, portions of which have been designated by the parties as part of the record, Mr. Metzler testified that under amendment No. 9, attachment 4, "if the new layout of the glass--the layout fell such that you needed to add a structural member, [Clark] would be responsible for designing and providing that." D.Tr., Metzler, 96-97. Mr. Metzler also testified that:

I think of the Conservatory framing system as wherever there was glass, the glass houses. That's what I think of the Conservatory framing system- -I mean as the Conservatory. And the members of that would include trusses; purlins; I'm going to use the word "blocking," which typically might not be a structural member. Basically anything that I would need to install that glass-house system.

*Id.* at 98.

Our review of the language of amendment No. 9 indicates that it did not have the profound effect on the parties' design responsibilities as was apparently believed by AOC during contract performance. The amendment's primary purpose was to change the glass size to a smaller one to replicate the originally existing glass size.<sup>20</sup> The amendment did not specifically state that the design responsibilities under sections 05140 and 13123 of the contract were changed to transfer all responsibility under section 05140 from AOC to Clark, as would be expected if such a fundamental change in the parties' design responsibilities was intended.<sup>21</sup> *See* C4 Supp. 22 2972-73. In fact, although amendment No. 9 is relevant in resolving some of the disputes concerning the parties' respective responsibilities in renovating the Palm House, most of the disputes were resolved based upon an analysis of the language in sections 05140 and 13123 of

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<sup>20</sup> In contrast, Appellant interpreted amendment No. 9, attachment 4, as requiring Rough Brothers to replicate the original existing glazing system to a large degree. *See* H.Tr., Witt, 19:52; O'Hanlon, 18:114. As discussed below in connection with Clark Change Order No. 810028, we found that amendment No. 9, attachment 4, did not require the replication of all aspects of the existing glazing system.

<sup>21</sup> Both William O'Hanlon, Clark's expert in the areas of structural engineering and conservatory renovations, and AOC's own structural engineering expert, James Lakey, testified that amendment No. 9, attachment 4 did not transfer design responsibility of the main structure aluminum frame to Clark. H.Tr., O'Hanlon, 18:78-79; H.Tr., Lakey, 27:119; *see* A4 Supp. R00862 at 13-14. Contrary to Clark's suggestions, however, Mr. Lakey did not make any other statements in his testimony regarding the parties' respective design responsibilities. While Clark elicited hearsay testimony from Dale Kern, Clark's scheduling expert, providing further details regarding what Mr. Lakey allegedly said in his deposition, H.Tr., Kern, 21:80, we will not consider this testimony because Mr. Lakey was a witness at the trial subsequent to Mr. Kern and was not asked questions that elicited the details referenced by Mr. Kern, and because Mr. Lakey's deposition is not part of the record.

the contract, without regard to amendment No. 9, attachment 4.<sup>22</sup> See COD, ch. 2, at 9-13; ch. 3, at 25-30, 35-37.

### E. Rules Governing Interpretation of Contract

In interpreting a contract, a forum's fundamental objective is to ascertain the parties' intent and effectuate the purpose of their agreement. *P.R. Burke Corp. v. United States*, 47 Fed. Cl. 340, 347 (2000). In so doing, the forum must start with the express language found in the contract and it is the representations found in the specifications and drawings, not the subjective intent of the drafter that govern the contract interpretation. *Id.* As stated by the Court of Federal Claims,

When interpreting the language of a contract, a court must give reasonable meaning to all parts of the contract and not render portions of the contract meaningless. *Fortec Constructors v. United States*, 760 F.2d 1288, 1292 (Fed. Cir. 1985); *United States v. Johnson Controls, Inc.*, 713 F.2d 1541, 1555 (Fed. Cir. 1983). Otherwise stated, in ascertaining the intentions of the parties, the contract should be construed in its entirety, "so as to harmonize and give meaning to all its provisions." *Thanet Corp., v. United States*, 219 Ct. Cl. 75, 82, 591 F.2d 629, 633 (1979); *ITT Arctic Services, Inc., v. United States*, 207 Ct. Cl. 743, 751-52, 524 F.2d 680 (1975); *accord Firestone Tire & Rubber Co. v. United States*, 195 Ct. Cl. 21, 30, 444 F.2d 547, 551 (1971). The language of a contract, moreover, must be given the meaning that would be derived from the contract by a "reasonably intelligent person acquainted with the contemporaneous circumstances." *Hol-Gar Mfg. Corp. v. United States*, 169 Ct. Cl. 384, 388, 351 F.2d 972, 975 (1965).

*M.A. Mortenson Co. v. United States*, 29 Fed. Cl. 82, 96 (1993). In interpreting the contract as a whole, great weight will also be accorded to the principal purpose of the parties, as indicated by the express language in the contract. *Cibinic & Nash, Administration of Government Contracts*, at 161; *G.M. Shupe, Inc. v. United States*, 5 Cl. Ct. 662, 708 (1984); *J.W. Bateson Co., Inc.*, VACAB No. 676, January 31, 1968, 68-1 BCA ¶ 6829 at 31,560.

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<sup>22</sup> Notwithstanding AOC's references to amendment No. 9 in later correspondence, AOC and DMJM had advised Clark and its subcontractors as early as May and July of 1999 (with respect to the rolling ladders and additional purlins issues) that providing additional support for the glazing system was Clark's responsibility under section 13123 and did rely upon amendment No. 9. See A4 Supp. R00631, R00633. The record suggests that there may have been disagreement within AOC as to whether amendment No. 9 was the reason that Clark assertedly had responsibility regarding the design of the aluminum structure. See e.g., R4, COF 4270 (Memorandum of James Krapp), on which he added the handwritten internal note to Mr. Metzler on or about September 12, 2000, stating, "This was one of the infamous '4' structural design issues. Based on our 'current' position, I guess this is a Clark design req[ui]rement[ment]." As argued by Clark, this memorandum suggests that AOC's position may have changed with regard to the applicability of amendment No. 9, attachment 4. However, as noted above, AOC had previously grounded its position of the parties' respective design responsibilities on sections 01540 and 13123 of the contract and that is the primary basis for its position on most of these disputes in this appeal.

## F. Clark's Coordination Responsibilities

In order to resolve many of the disputes of this appeal, the parties' relative design responsibilities must be read in conjunction with Clark's responsibility under the contract to coordinate the contract work. Boards of contract appeals have long held that the prime contractor, as the general contractor, has the responsibility to coordinate all trades, and assure that each trade is aware of relevant information normally appearing on drawings applicable to other trades. See *David Boland, Inc.*, ASBCA Nos. 51259, 51359, May 8, 2001, 01-2 BCA ¶ 31,423 at 155,171. As was stated by Armed Services Board of Contract Appeals:

It is the duty of the prime contractor to reconcile any problems for various trade subcontractors, where the work is clearly required by the contract, but may not fully be shown within a single series of drawings. *Dawson Constr. Company, Inc.*, ASBCA No. 29447, [January 18, 1985], 85-1 BCA ¶ 17,862 at 89,415; *M.A. Mortenson Company*, ASBCA No. 28936, [April 17, 1984], 84-2 BCA ¶ 17,337 at 186,397-98. The prime contractor had a duty to coordinate among the trades, and ensure all the work was properly done. *Gibbs Constr. Co., Inc.*, ASBCA No. 37880, [July 20, 1990] 90-3 BCA ¶ 23,171.

*M.A. Mortenson Co.*, ASBCA Nos. 53062 *et al.*, August 17, 2001, 01-2 BCA ¶ 31,573 at 155,913.

Moreover, here, Clark's contract specifically placed on Clark the duty to coordinate its work among its various subcontractors. That is, Clark was required to "[c]ontinuously coordinate the work of subcontractors" and to "require each subcontractor to examine work of other trades and all sections of specifications to assure satisfactory installation of, and connection between, [its] work and work of other trades." R4, K0079. The contract also provided that Clark was:

[r]esponsible for all acts of subcontractors employed by him under this contract, and for their compliance with all terms and provisions of the contract applicable to their performance. The Contractor shall continuously coordinate the work of all subcontractors to assure proper processing and progress of the work. The Contractor shall require each subcontractor to (1) examine the project schedule, shop drawings and the work of other trades and all sections of the specifications to the extent necessary for satisfactory [i]nallation of his work, and connection between his work and work of the other trades; (2) coordinate his work accordingly; and (3) cooperate with other trades toward timely and satisfactory completion of the entire Work.

R4, K0040. Furthermore, the specifications governing the fabrication and erection of the structural aluminum work and design, fabrication, and installation of the glazing system also required coordination. See R4, K0480 ("Coordination: Structural aluminum work shall be fully coordinated with adjoining and supporting structural steel work, and the work of adjoining and adjacent architectural trades"); R4, K0910 ("Coordinate the glazing work with the conservatory framing and all related systems.")

Clark nevertheless argues that AOC's directive in its July 9, 1999 transmittal to certify the coordination of structural aluminum shop drawings with the glazing system contractor had a significant impact because "ordinarily, Standard Iron would be responsible for its shop drawings and Rough Brothers, independently, would be responsible for its shop drawings."

App. PFF ¶ 176. In this regard, Phillip Torchio, who represented Standard Iron, testified that it had not planned to coordinate its work with Rough Brothers until all of the shop drawings were completely prepared. *See* H.Tr., Torchio, 15:254. Similarly, Steven Witt, Rough Brothers' project manager for this contract, testified that he did not believe Rough Brothers was to coordinate with Standard Iron in designing its glazing system. H.Tr., Witt, 19:136.

Clark variously argues that, in the period after July 12, 1999 leading to the start of fabrication, the certification requirement resulted in Rough Brothers uncovering further design problems that caused additional delay, *see* App. PFF ¶ 289, and that the certification requirement "meant that Rough was now without recourse if Standard Iron's structural aluminum did not marry-up with Rough's system." App. PFF ¶ 178. Mr. Witt testified in this regard:

Q. Okay. When Clark asked you to certify coordination with [Standard Iron's] shop drawings, what impact if any did that have on your review beyond those required under your subcontract?

A. I guess in my opinion if- if I was just reviewing the documents, I'd be looking at them, maybe make some comments or - - or remarks, but it's not my- if there's something wrong with the documents, with- with those shop drawings, it's not my responsibility to fix them.

Q. And how does that -

A. And -and the difference, I guess, between- to certify them basically, it- it- it- it's telling me that- that I'm being required to go beyond just a - casual review and feel like I would be taking responsibility for- for their shop drawings. If I miss something, I- I would be responsible for- for that item.

H.Tr., Witt, 19:280-81.

We fail to see, nor has Clark shown us, how AOC's requirement that Clark certify compliance with its contractual requirement to coordinate the work of its subcontractors imposed any undue burden or otherwise materially affected Clark's pre-existing obligation to coordinate. The gist of Clark's arguments appears to be that its subcontractors did not plan to coordinate their work with each other, so the required coordination was onerous. Even if this were true, the subcontractors' performance intentions did not relieve Clark of its contractual obligation to AOC to coordinate this work. In fact, Clark recognized the need for this type of coordination in its proposal for this project, where it stated that "the glass house subcontractor and the structural subcontractor will

exchange drawings and details to ensure coordination.”<sup>23</sup> See R4, NFO 1062. The fact that Rough Brothers may have uncovered other “design problems” through its review of Standard Iron’s structural aluminum shop drawings does not demonstrate that the certification requirement was onerous, given that uncovering and correcting problems between associated trades was exactly what the contract coordination requirement sought. Moreover, the record contains various coordination comments by Rough Brothers unrelated to the alleged structural design defects where Rough Brothers was ensuring that the aluminum structure would be fabricated in a manner to properly support, or “marry up” with, Rough Brothers’ custom designed glazing system, a detailed review that apparently was not commenced until AOC imposed the certification requirement. See, e.g., C4 Supp. 21 2343-45; A4 Supp. R00059, R00608. In sum, although AOC’s direction that Clark certify its fulfillment of the coordination requirement may well have ultimately extended the completion of the contract, not only was coordination of the subcontractors’ work a contract requirement, but it appears that without that coordination there would have been many more problems and delays in constructing the Palm House.

### **III. CRITICAL PATH DELAY OF CONTRACT**

As indicated, the contract was required to be completed by September 5, 2000 and the parties now agree that it was substantially complete on August 31, 2001. R4, K0054; Resp. PFF, part 1, Introduction, at 4; H.Tr., Kern, 21:98-99. Thus, there was a 360 calendar day delay in completing this contract. Clark and its subcontractors have submitted various claims for delay and acceleration damages based upon this delay, and the contracting officer’s decision has assessed liquidated damages of \$178,500 for 150 days of the delay. See COD, part 5, at 2. Clark asserts that the critical path delay was primarily caused by AOC’s defective specifications and failure to timely resolve the issues concerning the defective specifications, whereas AOC asserts that the delay was caused by matters for which Clark and its subcontractors were responsible.

#### **A. Applicable Law for Critical Path Delay**

As indicated above, it is well settled that when the government orders a structure to be built and in so doing prepares the specifications prescribing the character, dimension and location of the construction work, it implicitly warrants that conformance with the specifications will result in satisfactory performance. *United States v. Spearin*, 248 U.S. at 136; *Luria Bros & Co. v. United States*, 177 Ct. Cl. 676, 687; 369 F.2d 701 (1966). Thus, where defective design specifications delay completion of the contract, the contractor is generally entitled to recover damages associated with its delay for the government’s breach of the implied warranty. *Laburnum Constr. Corp. v. United States*, 163 Ct. Cl. 339, 350; 325 F.2d 451 (1963). On other hand, if performance specifications are involved, the government gives no such warranty because the contractor is tasked with the general responsibility and risk for achieving the performance specifications. *Stuyvesant Dredging Co. v. United States*, 834 F.2d at 1582.

Contractors may recover damages for delay to defective design specifications under the Changes clause and under the Suspension of Work clause, both of which were included in this contract.

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<sup>23</sup> Mr. Witt also recognized that coordination with Standard Iron was necessary to ensure that the glazing system would “fit together” with the conservatory structure. See D.Tr., Witt, 142-43, 157-58.

*See Hol-Gar Mfg. Corp. v. United States*, 175 Ct. Cl. 518, 523-25; 360 F.2d 634 (1966) (Changes clause); *Chaney & James Constr. Co. v. United States*, 190 Ct. Cl. 699, 704-05; 421 F.2d 728 (1970) (Suspension of Work clause). Clark has not identified, however, under which clause it asserts that it is entitled to recover delay damages.<sup>24</sup> We assume that Clark is pursuing the delay claims here under the Changes clause because the claims include profit, and the Changes clause allows for the recovery of profit, whereas the Suspension of Work clause specifically prohibits the recovery of profit. *See* R4, K0051 (incorporating by reference FAR § 52.243-4, Changes (August 1987)); R4, K0049-50, Suspension of Work clause. Given that the Suspension of Work clause expressly provides that damages for delay would not be recovered under that clause where “an equitable adjustment is provided for or excluded under any other term or condition of the contract,” R4, K0050, we will analyze this delay claim insofar as it is based upon alleged defective specifications under the Changes clause.<sup>25</sup> In this regard, the Claims Court has held that where delay damages based on defective design are sought by a contractor under both clauses, the Changes clause takes priority. *American Line Builders, Inc. v. United States*, 26 Cl. Ct. 1155, 1178 (1992).

In pursuing a claim against the government, including one for delay damages, the “essential burden of establishing the fundamental facts of liability, causation and resultant injury” rests on the contractor. *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. 180, 199; 351 F.2d 956, (1965). A contractor seeking to prove the government’s liability for a delay based on allegedly defective specifications has the burden of proving the extent of the alleged delay, the causal link between the government’s wrongful acts and the delay in the contractor’s performance, and the alleged harm to the contractor for the delay. *Kinetic Builder’s Inc., v. Peters*, 226 F.3d 1307, 1316 (Fed. Cir. 2000); *Essex Electro Engineers, Inc. v. Danzig*, 224 F.3d 1283, 1295 (Fed. Cir. 2000). According to the Court of Federal Claims:

[The] plaintiff bears the burden of demonstrating that (1) the alleged delay was caused proximately by the government [citations omitted]; (2) the delay caused specific and quantifiable damages which harmed the contractor [citations omitted]; and (3) the extent and period of the alleged delay was unreasonable and is provable within a reasonable degree of certainty. [citations omitted]. Moreover, in proving its case, plaintiff bears the “heavy burden” of demonstrating each element of this three-part test by “substantial evidence.” *William F. Klingensmith, Inc. v. United States*, 731 F.2d 805, 808-09 (Fed. Cir. 1984); *Blinderman Constr. Co., v. United States*, 695 F.2d 552, 559 (Fed. Cir. 1982).

*L&A Jackson Enterprises v. United States*, 38 Fed. Cl. 22, 37 (1997).

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<sup>24</sup> Nor has AOC argued which clause should be applicable here.

<sup>25</sup> Delay claims based on defective specifications are analyzed in a very similar manner regardless of whether the Changes or Suspension of Work clause is applicable, with cases decided under one clause being commonly cited by courts and boards in the analysis of delay claims under the other clause. *See generally* David W. James, *Concurrency and Apportioning Liability and Damages in Public Contract Adjudications*, 20 Pub. Cont. L.J. 490 (1991).

Broad generalities that the government must have caused some delay or damage because the contractor took longer than anticipated to complete the contract are insufficient to meet the basic burden of proof requirements. *Commerce Int'l Co., Inc. v. United States*, 167 Ct. Cl. 529, 542-43, 338 F.2d 81 (1964). Instead, in order for a contractor to recover delay damages, there must be "specific evidence" showing that activities on the critical path were delayed solely by government action with no concurrent delay. See *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. 184, 198-99 (1998), *rev'd on other grounds*, 178 F.3d 1313 (Fed. Cir. 1999); *F.G. Haggerty Plumbing Co., Inc.*, VABCA No. 4482, April 25, 1995, 95-2 BCA ¶ 27,671 at 137,956-57. In short, "there must be evidence to show the objective impact of such cause [for delay] on the work . . . the Appellant has the burden of establishing by a preponderance of the evidence not only the existence of . . . delay, but also the extent to which completion of the contract work as a whole was delayed thereby." *Dawson Constr. Co., Inc.*, VABCA Nos. 3306 3310, June 25, 1993, 93-3 BCA ¶ 26,177 at 130,314; see also Michael R. Finke, *The Burden of Proof in Government Contract Schedule Delay Claims*, 22 Pub. Contr. L.J. 125, 139-42 (1992).

A "total time" theory of recovering delay damages, where the contractor presents evidence concerning a number of incidents that assertedly caused delay, without proving the "crucial fact" of the specific extent to which the wrongful delay was caused by the incidents or any individual incident, is too unreliable to be accepted as a method of proving delay damages. *Morganti National, Inc. v. United States*, 49 Fed. Cl. 110, 134 (2001); *Law v. United States*, 195 Ct. Cl. 370, 382 (1971).<sup>26</sup> A "total time approach is no less susceptible to inaccuracies than the total cost theory." *Law v. United States*, *supra*, citing *WRB Corp. v. United States*, 183 Ct. Cl. 409, 427 (1968). While the forum can rely on other evidence in the record to determine the extent of compensable delay where the "total time" approach has been rejected, see *Morganti National, Inc. v. United States*, 49 Fed. Cl. at 134, in order for the forum to do so, the record must contain specific evidence showing that critical path activities were delayed solely by government action with no concurrent delay. *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198-99.

As indicated above, in establishing the causal link for extended term delay damages, the contractor must show that the government's action affected activities on the critical path of the contractor's performance of the contract; only delay on the critical path that affects a project's completion date is compensable. *Kinetic Builder's Inc., v. Peters*, 226 F.3d at 1317; *Sauer Inc. v. Danzig*, 224 F.3d 1340, 1345-46 (Fed. Cir. 2000); *Mega Constr. Co., Inc. v. United States*, 29 Fed. Cl. 396, 425 (1993). Thus, in order for a court or board of contract appeals to award damages for such delay, the forum must have before it evidence that establishes the critical path of the project. See *Wilner v. United States*, 26 Cl. Ct. at 263.

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<sup>26</sup> In *Law*, the court found that the contractor "simply [took] the original and extended completion dates, compute[d] therefrom the intervening time or overrun, point[ed] to a host of individual delay incidents for which defendant was allegedly responsible and which 'contributed' to the overall extended time, and then leap[ed] to the conclusion that the entire overrun time was attributable to defendant." *Law v. United States*, 195 Ct. Cl. at 382. As discussed below, this was essentially the approach taken by Clark with regard to several of the periods where Clark's performance was delayed.

Moreover, where both the contractor and the agency contribute to a period of delay, neither can recover damages unless the record establishes a clear apportionment of the delay and the expense attributable to each party. *T. Brown Constructors, Inc. v. Pena*, 132 F.3d 724, 734-35 (Fed. Cir. 1997); *William F. Klingensmith, Inc. v. United States*, 731 F.2d at 809; *Blinderman Constr. Co., v. United States*, 695 F.2d 552, 559 (Fed. Cir. 1982). That is, in order to recover damages for any particular period of delay, the contractor must show that the government was the "sole proximate cause" of the delay, and that there are no concurrent delays, which absent a "clear apportionment" will defeat any recovery; in other words, where there is no basis in the record to apportion the delay attributable to each party, the contractor cannot recover delay costs. *William F. Klingensmith, Inc. v. United States*, 731 F.2d at 809; *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198; *Dawson Constr. Co., Inc., supra*, at 130,313; *see generally*, James, *Concurrency and Apportioning Liability and Damages in Public Contract Adjudications*, 20 Pub. Cont. L.J. 490.

In analyzing whether delay is the responsibility of either the government or the contractor, or whether the delay was concurrently caused, the CPM method can be used to analyze and allocate the responsibility for delay in any particular period or activity. *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198; Michael R. Finke, *The Burden of Proof in Government Contract Schedule Delay Claims*, 22 Pub Contr. L.J. at 135-37. As explained by the Court of Claims:

Essentially, the critical path method is an efficient way of organizing and scheduling a complex project which consists of numerous interrelated separate small projects. Each subproject is identified and classified as to the duration and precedence of the work. (E.g., one could not carpet an area until the flooring is down and the flooring cannot be completed until the underlying electrical and telephone conduits are installed.) The data is then analyzed, usually by computer, to determine the most efficient schedule for the entire project. Many subprojects may be performed at any time within a given period without any effect on the completion of the entire project. However, some items of work are given no leeway and must be performed on schedule; otherwise, the entire project will be delayed. These latter items of work are on the "critical path." A delay, or acceleration, of work along the critical path will affect the entire project.

*Haney v. United States*, 230 Ct. Cl. 148, 167-68, 676 F.2d 595 (1982). As further explained by the Court of Federal Claims:

The reason that the determination of the critical path is crucial to the calculation of delay damages is that only construction work on the critical path ha[s] an impact upon the time in which the project [i]s completed. If work on the critical path [i]s delayed, then the eventual completion date of the project [i]s delayed. Delay involving work not on the critical path generally ha[s] no impact on the eventual completion date of the project. . . . [The] critical path periods provide the court with the foundation necessary to reach delay damage conclusions.

*Mega Const. Co., Inc. v. United States*, 29 Fed. Cl. at 425, quoting *G.M. Shupe, Inc. v. United States*, 5 Cl. Ct. at 728-730. Simply stated, under a CPM analysis, for any delay found on the critical path, a corresponding delay to project completion will be found. *Donohoe Constr. Co.*, ASBCA Nos. 47310 *et al.*, October 13, 1998, 98-2 BCA ¶ 30,076 at 148,811.

## **B. CPM Schedule Under Contract**

This contract contemplated that work would be managed using a CPM schedule and to that end contained detailed requirements for the preparation, approval and updating of the CPM schedules. R4, K0096-104. According to the contract, the approved CPM schedule was to be used by the contractor to execute its work under the contract, including planning, organizing, and directing and reporting progress on the work.<sup>27</sup> R4, K0097. This schedule and its updates were to assure a standard, against which satisfactory contract progress could be judged, and to assist AOC in monitoring Clark's contract progress and in coordinating the work. R4, K0096. The approved schedule was required to be updated on a monthly basis for "the purpose of recording and monitoring the progress of the work and establishing the value of partial payment." R4, K0101. The contractor was also required to meet with AOC to review actual progress made to date, activities started and completed to date, and the percentages of work completed to date on each activity started but not completed. *Id.* If work under the contract fell behind schedule, or indicated a trend that the project was moving in that direction, the contractor was required to provide a narrative description as well as a list of any logic changes of the action to be taken to ensure that the work will be completed within the required time for completion. *Id.* The contract also provided:

The contractor shall submit revisions to logic sequencing in the event the execution of his work differs from that shown on the Approved Project Schedule or if the conditions in [section 01312.1.4B.3] above exist. If the Contractor for any other reason desires to make changes in the Approved Project Schedule to incorporate revisions, he shall notify the Architect, in writing, stating the reason for the proposed revision.

*Id.* In addition, the contract provided that "[t]o the extent that the network schedule or any revised network diagram prepared by the Contractor shows anything not jointly agreed upon, it shall not be deemed to have been accepted by the Contracting Officer." R4, K0102.

Clark submitted its CPM schedule to AOC for approval on January 31, 1999. Resp. Exh. 53. As contemplated by the contract, this schedule identified the construction work activities, the party or parties responsible for the activities (AOC, Clark or a particular subcontractor), the area of the work activity, the planned duration of the activity in work days, the critical path ("longest path

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<sup>27</sup> Respondent's scheduling expert, Peter Heroy, testified that "the baseline schedule is to be used for several reasons. It was to be used for controlling and executing work. It was also to be used for because it was cost loaded for progress payments. It was to be used for measuring progress or lack thereof of the job. The baseline schedule was to be used in conjunction with fragments for incorporating extra work that may have been presented by change order into the schedule. And also for analyzing the time impact, perhaps, of any change order work." H.Tr., Heroy, 23:67-68.

through the project schedule”), and total float for each activity (not on the critical path).<sup>28</sup>  
Baseline CPM Schedule.

On April 22, 1999, AOC notified Clark that its CPM schedule was acceptable for the project, but noted several items that were required to be resolved. C4 Supp. 21 0940-941. Even prior to AOC’s approval of its CPM schedule, Clark commenced submitting CPM updates on a monthly basis. Clark continued these updates until it developed new schedules in January 2000, called the “DC-99” schedule and subsequently the BGR (Botanic Garden Recovery) schedule, to which Clark submitted monthly updates to AOC to the end of the project. H.Tr., Sullivan, 13:54-59.

### C. Summary of Critical Path Delay Analysis Methodology

We will first determine the responsibility for the 360 days that this contract was delayed in order to ascertain to what extent Clark and its subcontractors may recover for delay and acceleration claims based upon the increased contract term, and to determine the extent to which AOC’s assessment of liquidated damages was proper.

During this litigation, both Clark and AOC presented reports and testimony from CPM experts, who reached diametrically different conclusions regarding which party was responsible for the 360-day delay in completing this contract. The reports and testimony of the parties’ CPM scheduling experts, Mr. Heroy of Pinnacle One for AOC and Dale Kern of Peterson Barrington for Clark,<sup>29</sup> both analyzed this delay claim by comparing the critical paths identified on the as-built CPM schedule and the as-planned CPM schedule using a windows analysis.<sup>30</sup>

It has been recognized by courts and boards of contract appeals that “if the CPM is to be used to evaluate delay on the project, it must be kept current and must reflect delays as they occur.” and the usefulness of a CPM is dependent on the “extent to which it is employed in an accurate and consistent manner to comport with the events actually occurring on the job.” *Fortec Constructors v. United States*, 8 Cl. Ct. 490, 505 (1985), *aff’d*, 804 F.2d 141 (Fed. Cir. 1986); *Dawson Constr. Co., Inc.*, *supra*, at 130,314.

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<sup>28</sup> According to Mr. Heroy, “Float would be the amount of time between the end of one activity and the start of an activity on the succeeding activity on the critical path. In other words, how much time does it have before it itself would become critical.” H.Tr., Heroy, 23:96.

<sup>29</sup> Mr. Kern of Peterson Barrington was accepted by the Board as an expert in construction management and scheduling. H.Tr., Kern, 21:21-22. Mr. Heroy of Pinnacle One was accepted, over Clark’s objection, as an expert in critical path analysis, investigation of engineering and construction schedules and investigation of delay claims. H.Tr., Heroy, 23:46-47.

<sup>30</sup> Mr. Heroy described a windows analysis as “take a period of time and see how much the schedule had lost or gained in that period of time and then try to analyze the delays within that period of time.” H.Tr., Heroy, 23:102; *see Donohoe Constr. Co.*, *supra* at 148,812; Jon M. Wickwire, Stephen B. Hurlbut & Lance J. Lerman, *Use of Critical Path Method Techniques in Contract Claims: Issues and Developments, 1974 to 1988*, 18 Pub. Cont. L.J. 338, 385 (1989).

Here, as discussed in detail below, it is not clear that the initially approved CPM schedule was properly updated or used under this contract. Moreover, the updates to the approved baseline schedule were essentially abandoned by Clark by January 2000 in managing the progress of the contract work in favor of the so-called "DC-99" and "BGR" schedules (which were never approved by AOC). For these reasons, the updates to the initially approved baseline CPM schedule likely would not have been particularly useful in analyzing critical path delay under this contract, even if they had been provided to the Board (which they were not). Indeed, the parties' scheduling experts have not relied upon these updates in assessing the delay claims.

Despite the parties' experts' differing conclusions regarding responsibility for delay, they do not dispute the designation of the critical path (that is, the longest path through the schedule) in Clark's approved as-planned, baseline CPM schedule. There is also no dispute as to the as-built critical path, that is, the critical path for the project as it was actually built based on a review of the project documents. In fact, the parties agree that the as-planned critical path and the as-built critical path are essentially the same. The as-planned and as-built critical paths are as follows:

Activity	As-Planned		As-Built	
	Start	Finish	Start	Finish <sup>31</sup>
<b>Palm House Structural Aluminum--Standard Iron</b>				
Prepare and submit shop drawings	1 Feb. 99	12 Mar. 99	1 Feb. 99 <sup>32</sup>	12 July 99
Approve shop drawing by AOC	15 Mar. 99	9 Apr. 99	12 July 99	23 Aug. 99
Procure, fabricate/deliver structural aluminum	12 Apr. 99 <sup>33</sup>	19 July 99	24 Aug. 99 <sup>34</sup>	18 Apr. 00
Install structural aluminum I, II & III	20 July 99	21 Sept. 99	19 Apr. 00	3 Aug. 00
Install maintenance levels 4, 3 & 2/miscellaneous metals	22 Sept. 99	9 Nov. 99	3 Aug. 00	25 Sept. 00
<b>Erect Scaffolding--Clark</b>				
Erect scaffolding	10 Nov. 99	16 Nov. 99	25 Sept. 00	25 Sept. 00
<b>Glazing System Conservatory--Rough Brothers</b>				
Install monitor roof aluminum I and II and roof vents	17 Nov. 99	21 Jan. 00	25 Sept. 00	6 Dec. 00
Install main roof aluminum	24 Jan. 00	11 Feb. 00	6 Dec. 00	10 Apr. 01
Install main roof glass I	14 Feb. 00	3 Mar. 00	10 Apr. 01	27 Apr. or 1 May 01

<sup>31</sup> The as-built CPM schedule showed that many of these activities continued beyond the as-built finish date of the critical path portion of this activity. This table only presents the portion of the activity that was considered to be on the critical path.

<sup>32</sup> Mr. Kern's analysis starts his as-built analysis on this activity on February 11. Because this activity was scheduled to begin February 1 on Clark's as-planned CPM schedule, we have used that date as the start for this activity.

<sup>33</sup> The scheduled start of actual fabrication of the aluminum structure was May 31, 1999. App. Exh. 92 at 3.

<sup>34</sup> Actual fabrication of the aluminum structure began on October 8, 1999. App. Exh. 92 at 3.

Other Contractors to Finish				
R.I./pull/connect walkway power and Itg. (I & II)--Judd	6 Mar. 00	26 May 00	27 Apr. or 1 May 01	18 June 01
R.I./pull/connect 1 <sup>st</sup> flr. Itg. and fixtures; install temp/RH sensors—Judd	29 May 00	26 June 00	18 June 01	Unknown
Start up/testing	27 June 00	25 July 00	Unknown	Unknown
Install plants I & II	26 July 00	8 Aug. 00	Unknown	Unknown
Punchlist items	9 Aug. 00	5 Sept. 00	Unknown	31 Aug. 01

Resp. Exhs. 53, 61; App. Exh. 92.

In addition, as indicated, the parties now agree that the contract was substantially complete on August 31, 2001.<sup>35</sup> Resp. PFF, part 1, introduction, at 4; H.Tr., Kern, 21:98-99. Inasmuch as September 5, 2000 is the completion date established by the contract, R4, K0077, the parties now agree that the project was delayed by 360 calendar days.<sup>36</sup> App. Exh. 92 at 3.

Given the areas of agreement of the parties, we think that the use of a CPM analysis to compare the as-planned and as-built critical path activities is appropriate to analyze the delay under this contract to determine the amount of delay and to ascertain which party was responsible for particular periods of delay or whether delays were concurrent.<sup>37</sup>

#### D. Parties' Scheduling Experts' Conclusions

As indicated, both CPM experts employed a similar "windows" analysis, which divided the project into distinct periods and compared the as-built CPM schedule to the baseline CPM schedule in order to assess the causes of the delay. However, each expert used slightly different windows in his respective analysis.

Mr. Kern's analysis had the following five windows:

<sup>35</sup> The contracting officer's decision on Clark's claim found that the date for substantial completion was September 30, 2001. COD, part 5.

<sup>36</sup> Although Clark's as-planned baseline schedule used work days to calculate the time allowed for each activity, Clark's claim is based upon calendar days. The Board has used calendar days in its review of Clark's appeal.

<sup>37</sup> As explained by Mr. Kern, because the critical path work was done basically in the same sequence as was planned, the CPM updates did not have to be used in the CPM analysis because the CPM did not have to be "rebaselin[ed]." H.Tr., Kern, 21:38.

1. Standard Iron Detailing Delays (from February 11, 1999 through October 8, 1999),<sup>38</sup> which included the critical path activities of preparing and submitting Standard Iron shop drawings for the Palm House aluminum structure, AOC's approval of the shop drawings, and that portion of the procurement, fabrication and delivery of the Palm House aluminum structure activity up to the start of fabrication. In his report prepared prior to the hearing, Mr. Kern found that there were 130 calendar days of delay for this period and determined that AOC was responsible for 89 days of this delay and that 41 days of the delay were "unresolved." At the hearing, Mr. Kern stated that, based upon his review of additional evidence, that AOC was responsible for all 130 days of delay. See H.Tr., Kern, 21:39-48.
2. Standard Iron Fabrication Delays (from October 8, 1999 to April 19, 2000), which included the remainder of the critical path activity of procuring, fabricating and delivering of the Palm House aluminum structure. For this period, he determined that there were 144 calendar days of delay and that all of this delay was AOC's responsibility.
3. Standard Iron Erection Delays (from April 19, 2000 through September 25, 2000), which included the critical path activities of installation of structural aluminum I, II, and III and installation of maintenance levels 4, 3 and 2 miscellaneous metals. For this period, Mr. Kern found 39 calendar days of delay and determined that Clark was responsible for 8 days of the delay, AOC for 16 days of the delay and that 15 days were "unresolved."
4. Second Truss Lacing Issue (from September 25, 2000 to April 10, 2001), which included the critical path activities of Rough Brothers' installation of monitor roof aluminum I and II, monitor roof vents, and main roof aluminum, and the truss lacing and other repairs in the Palm House. For this period, Mr. Kern found 108 calendar days of delay, for which AOC was responsible.
5. Acceleration to Project Completion (from April 10, 2001 to August 31, 2001), which included the remainder of Rough Brothers' glazing system and the other construction activities to the completion of the project on August 31. For this period, Mr. Kern found that Clark had mitigated the delay by accelerating its performance by 61 calendar days, so that the project was only delayed by 360 calendar days.

App. Exhs. 92, 94.

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<sup>38</sup> Mr. Kern began his analysis of this period on February 11, 1999 rather than February 1, which was the as-planned beginning date for the preparation and submission of the Palm House shop drawings for the Palm House aluminum structure activity on Clark's baseline schedule. Although Mr. Kern does not explain why he did this, it seems fair to assume that it was because he found that the work under this activity did not begin until February 11. This does not adversely affect the logic of Mr. Kern's analysis, however, because he carries forward this 10-day delay to the subsequent windows in his analysis.

Thus, in summary, before the hearing, Mr. Kern concluded that there were a total 421 calendar days of delay, and that AOC was responsible for 357 days of delay, Clark for 8 days of delay, and 56 days were "unresolved," and that Clark accelerated its performance by 61 days so that it was able to finish with only 360 days of delay. App. Exh. 92 at 27. During the hearing, based on his review of additional evidence, he modified his views and ultimately concluded that AOC was responsible for 398 days of delay, Clark was responsible for 8 days of delay and 15 days of delay were "unresolved," and that Clark accelerated its performance for 61 days so that work was completed only 360 days late. App. Exh. 94.

Mr. Heroy's used basically the same methodology as Mr. Kern in his CPM windows analysis, but using somewhat different windows.<sup>39</sup>

1. End of January 1999 to end of March 1999, which included the first part of the critical path activity of Standard Iron's preparing the Palm House aluminum structure shop drawings. Mr. Heroy found that there were 38 work days of delay caused by Standard Iron's late start of this activity.
2. End of March 1999 to mid-July 1999, which included the remainder of the critical path activity of the preparation and submission of the Palm House aluminum structure shop drawings. For this period, Mr. Heroy found there were 48 work days of delay, for which he initially found the cause was "unknown." During the hearing, based upon his review of additional evidence, Mr. Heroy modified his position and found that Clark was responsible for these 48 work days of delay.
3. Mid-July 1999 to mid-April 2000, which included the critical path activities of AOC's approval of the shop drawings and the fabrication and delivery of the Palm House aluminum structure. For this period, Mr. Heroy found that there were 107 work days of delay, and that Clark was responsible for 97 work days and AOC for 10 work days.
4. Mid-April 2000 to December 2000, which included the critical path activities of Standard Iron's installing the structural aluminum I, II and III; Standard Iron's installing maintenance levels 4, 3, and 2 miscellaneous metals; Clark's installation of the scaffolding; Rough Brother's installation of monitor roof aluminum I and II; Rough Brother's installation of monitor roof vents; and Rough Brother's installation of the main roof aluminum. For this period, Mr. Heroy found 31 work days of delay and

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<sup>39</sup> Mr. Heroy's calculations are based on work days, as were Clark's CPM submittals. However, the Board elected to consider Clark's claim based on calendar days because this was how Clark has presented its delay claim. For the same time period, work days are approximately 5/7 of the number of calendar days. Mr. Heroy's analysis was also based upon his assumption that substantial completion was on September 30, 2001; as indicated above, AOC now concedes that substantial completion occurred on August 31, 2001.

he initially found weather was the cause of 2 work days of delay and the reasons for the other 29 days of delay were "unknown." During the hearing, based upon his review of additional evidence, Mr. Heroy modified his position, and found for this period that weather was the cause of 2 work days of delay, AOC was responsible for 8 work days of delay, Clark was responsible for 9 work days of delay and the cause for 12 work days of delay was still "unknown."

5. December 2000 to September 2001, which included the Palm House roof truss and other repairs and the remaining activities on the critical path. Mr. Heroy found a 49-work day delay for this period and that Clark was responsible for 24 work days and AOC was responsible for 25 work days.

COD, app. B; Resp. Exh. 62.

In sum, before the hearing, AOC's expert, Mr. Heroy determined that there were 273 work days or 391 calendar days of delay, and that AOC was responsible for 34 work days or 48 calendar days of delay, Clark for 160 work days or 229 calendar days of delay, weather accounted for 2 work days or 4 calendar days of delay, and the cause for delay was "unknown" for 77 work days or 110 calendar days of delay.<sup>40</sup> COD, app. B. During the hearing, based upon review of additional evidence, Mr. Heroy also modified his position and determined that AOC was responsible for 46 work days of delay, Clark for 213 work days of delay, weather for 2 work days of delay and 12 work days of delay were "unresolved." See Resp. Exh. 62.

Mr. Kern testified that in reaching his conclusions he "gathered all of the relevant product documents from Clark," including correspondence, meeting minutes, design drawings, requests for information (RFI), daily reports, transmittals of drawings; interviewed Clark and subcontractor personnel; reviewed Clark's CPM updates; reviewed the depositions of personnel employed by AOC, DMJM, Rough Brothers, Standard Iron, and Clark; and listened to the trial testimony of witnesses from A&N Technical Services, Inc. (Standard Iron's subcontractor responsible for preparing shop drawings), Standard Iron and Rough Brothers. H.Tr., Kern, 21:15-19, 21, 23.

Mr. Heroy testified that in reaching his conclusions he reviewed, prior to this appeal being filed, relevant documents in AOC's files, including Clark's CPM updates, pay applications, meeting minutes, photographs and RFIs, and interviewed AOC and DMJM personnel and AOC's structural engineer expert. After this litigation was instituted, he reviewed records of Standard Iron, A&N, and Rough Brothers, listened to some of the testimony of a Rough Brothers' witness, and read certain deposition transcripts. H.Tr., Heroy, 23:52-57, 131-32, 138, 140-42; 24:52; 25:41, 147.

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<sup>40</sup> By our calculations, there should have been only 390 calendar days of delay under Mr. Heroy's logic: September 5, 2000 (original completion date stated in contract) to September 30, 2001 (substantial completion date) is 390 calendar days.

The general logic employed in the two experts' CPM analyses seems fundamentally sound. We have found no significant flaws in the logic of their sequencing of the activities and find the windows analysis methodology employed by the experts to be a useful way of determining the causes for the delay of this project. Indeed, we have used the methodology, including the windows established by Mr. Kern, Clark's scheduling expert, in analyzing Clark's delay claim, although ultimately we have generally disagreed with his conclusions. See *Donohoe Constr. Co., supra*, at 148,812.

#### **E. Credibility of Scheduling Experts**

As noted, there is considerable dispute over the respective conclusions reached by the parties' experts as to which party was responsible for the delay in particular periods of the project. While both experts' reports and testimony were valuable to the Board to provide a methodology for analyzing the delay claim, to help understand the sequencing of the activities, and in establishing an agreed upon as-built critical path, the Board found both experts' testimony to be colored by advocacy.<sup>41</sup> For example, these experts gave little consideration, much less rebuttal, to those facts, which suggested that the other party was responsible for certain periods of delay. Moreover, it was not always apparent what evidence formed the basis for many of the experts' opinions, and both experts repeatedly expressed conclusions without sufficient analysis and reference to specific evidence in the record as to why the conclusions were reasonable. For example, Mr. Kern's testimony generally simply listed alleged design defects and concluded that all delay in that period should be attributed to AOC without showing why this should be the case or considering countervailing facts; that is, for some of the periods he essentially used the unreliable "total time" analysis. This problem was exacerbated by the parties' general failure to reference, much less discuss, documentation in the record that was obviously relevant to the issues before this board.

As was observed by the Veterans Administration Board of Contract Appeals, when faced with similar circumstances:

In all too many instances, the testimony given at the hearing by Appellant's witnesses was of a general nature, lacking the specifics required to support its various arguments concerning delay to overall job progress. Because of this, the Board was forced to independently examine the drawings and logs to attempt to understand just how this generalized testimony related to lack of forward progress.

*Preston-Brady Co., Inc.*, VABCA No. 1849R, October 26, 1987, 88-1 BCA ¶ 20,260 at 102,541, and

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<sup>41</sup> This is not entirely surprising given that both actively supported their respective clients during the administration of this contract starting in 2000: Mr. Kern in preparing new scheduling reports and supporting Clark's claims for contract extensions, and Mr. Heroy in supporting AOC's analysis of the delay claims.

In litigation, we are often faced with purported opinion witnesses and experts representing conflicting viewpoints, where as the fact finder and judge, we must choose between their positions and conclusions. [Citations omitted.] However, even uncontroverted opinion evidence is not conclusive if it is intrinsically non-persuasive. *Sternberger v. United States*, 401 F.2d 1012 (Ct. Cl. 1968). In this "battle" of purported experts representing conflicting viewpoints, we found there were no clear winners.

*Bay Constr. Co.*, VABCA Nos. 5594 *et al.*, March 19, 2002, 02-1 BCA ¶ 31,795, at 157,045-46.

As explained below, given the lack of support cited and shown for these experts' scheduling opinions, we have not given great weight to either expert's opinion in reaching our decision, but give that weight indicated in this decision.

#### **IV. CRITICAL PATH DELAY ANALYSIS**

The Board adopts the windows CPM analysis to determine the causes for the 360-day delay in completing this project, using the methodology and windows used by Mr. Kern, Clark's scheduling expert, as our basic model.

##### **A. Period 1.**

**February 1, 1999 (Planned Beginning of the Palm House Structural Aluminum Shop Drawing Preparation Activity) through October 8, 1999 (Start of Fabrication under the Fabricate and Deliver Palm House Structural Aluminum Activity)--Total 130 Day Delay**

##### **1. Subperiod 1A.**

**Palm House Structural Aluminum Shop Drawing Preparation Activity  
February 1 through July 12, 1999**

##### **a. Summary of Subperiod IA**

The activity of preparing and submitting the shop drawings for the Palm House aluminum structure was on the critical path, as identified by Clark's January 31, 1999 baseline schedule, which was approved by AOC on April 22, 1999. C4 Supp. 21 0940-41; Resp. Exh. 53. Clark's approved as-planned schedule provided 6 weeks or 40 calendar days (and no float) for shop drawing preparation and submission, beginning February 1, 1999 and ending March 12, 1999. Resp. Exh. 53. As indicated by the analyses of both Clark's and AOC's experts, this critical path activity in fact continued until July 12 when the critical path moved to the next activity, AOC's approval of the submitted shop drawings.<sup>42</sup> App. Exh. 92 at 6; COD, exh. B, at 11. Based upon

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<sup>42</sup> Although some exhibits presented by Mr. Heroy indicate this submission occurred on July 13, he elsewhere recognizes that the submission occurred on July 12, COD, exh. B, at 11, which the record otherwise shows to be the submission date.

the as-planned start date for this activity of February 1,<sup>43</sup> this represents a 122-calendar day delay.

As indicated above, the design of the structural aluminum was governed by contract specification 01540 and by drawings prepared by DMJM on AOC's behalf. The contract also contained various requirements that Clark perform surveys of the as-built configurations of the site, using a registered surveyor, in conjunction with preparing these shop drawings. R4, K0477; K0483; Drawing S001, note 1. Clark was also required to prepare and submit shop drawings for AOC's approval.<sup>44</sup> R4, K0481.

Clark subcontracted the fabrication and erection of the structural aluminum to Standard Iron on December 11, 1998, *see* C4 Supp. 08 01458, and Standard Iron in turn subcontracted the necessary detailing and shop drawings of the Palm House to A&N.<sup>45</sup> A4 Supp. R00050. A&N performed this work at its facility in Birmingham, Alabama. H.Tr., Torchio, 15:212-13. AOC apparently did not visit the work site in Birmingham while this work was being performed during this period.

While contract award was made to Clark on October 1, 1998, A&N first learned of the renovation project over 3 months later in a January 19, 1999 meeting with Standard Iron, at which A&N reviewed project drawings. H.Tr., Torchio, 15:223. A&N's plan was to start detailing the Palm House arch trusses, starting at the bottom (where the new structural aluminum would attach to the existing steel columns) and working up to the roof structure. H.Tr., Miranda, 16:12-14. According to Mr. Kern, it was always Standard Iron's plan to submit the Palm House drawings as a single package. C4. Supp. 08 00130. Standard Iron's intention was to get all the shop drawings for the Palm House completed and approved by AOC, so that Standard Iron could "accomplish a very aggressive production schedule in an orderly fashion." H.Tr., Torchio, 15:222.

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<sup>43</sup> As indicated above, Mr. Kern has a start date of February 11 for this activity. Although he provides no explanation for this start date, this suggests that, based on his review of the records, this was the date when Standard Iron actually started work on this activity. Given that the as-planned start date was February 1, we think it is more appropriate to use that date for purposes of our delay analysis because late starts of critical path activities that ultimately cause overall contract delay are attributable to the contractor. *See T. Brown Constructors, Inc.*, DOTBCA No. 1986, August 18, 1995, 95-2 BCA ¶ 27,870 at 139,015-16, 139,021.

<sup>44</sup> Shop drawings are the product of detailing the design drawings provided by AOC. Specifically, the detailer provides full details of design drawings, such as showing connections, holes, plates, and other pertinent information to allow for fabrication. H.Tr., Miranda, 17:7-9; *see* R4, K0034.

<sup>45</sup> On January 21, 1999, A&N stated that it would provide the drawings for the Palm House for \$55,950. C4 Supp. 21 0085. A&N confirmed its subcontract with Standard Iron in a facsimile transmission on February 16, 1999, in which A&N agreed to "supply Details and E-drawings on the Palm House Portion of this project as indicated on the [compact disc] we received listed as Base Bid Dwg/Structural and as discussed with you at your site." A4 Supp. R00050.

However, as early as February 17, Standard Iron notified Clark that it was questionable whether the shop drawings would be completed by March 19, 1999,<sup>46</sup> and forwarded a note from Standard Iron's production manager that indicated that fabrication would be during the period from May 20 to June 30, 1999, with delivery to start on July 1, 1999. C4 Supp. 21 0311-312. This was not reported to AOC.

Resolution of what the parties call the "geometry issues" (explained below) dominated the early performance of this activity and we find that these problems significantly inhibited the actual preparation of the shop drawings.<sup>47</sup> In this regard, at its initial January 19 meeting, A&N noticed that the design drawings did not contain the dimensions between the existing Palm House structural steel columns, which A&N found necessary to prepare the drawings. H.Tr., Miranda, 17:15-16, 162-63. As described below, even when site survey information concerning the dimensions was provided A&N, A&N had difficulty resolving the "geometry issues," which significantly inhibited its work progress.

Another issue that arose in early February concerned the so-called "flattened lacing angles" on the aluminum arch trusses in the Palm House. Standard Iron found that DMJM's proposed design would not work. While this problem was noticed by Standard Iron by February 12, C4 Supp. 21 0278-280, the parties dispute when this matter was brought to AOC's attention. Ultimately, AOC acknowledged the flattened lacing angle was a design defect and on June 23 it issued a new flat bar design. C4 Supp. 21 1433-34.

On July 12, Clark submitted 14 shop drawings for Palm House girders and trusses to AOC. R4, SI0013-35. Included in this drawing package were Standard Iron's shop drawings for the AA, AB and AC Palm House arch trusses, which included DMJM's revision to the lacing angles for these trusses. This submission of the shop drawings on July 12 for key components of the Palm House aluminum structure was the final event in the preparation and submission of the shop drawings activity on the as-built critical path. As indicated above, the parties agree that the as-built critical path then moved to the next critical path activity, AOC's approval of these shop drawings.<sup>48</sup>

Thus, there was a 122-calendar day delay in sufficiently completing this activity to allow the project to move to the next critical path activity.

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<sup>46</sup> Clark's baseline schedule indicated that March 12 was the planned completion date, Resp. Exh. 53, and Clark's February 28 CPM update reported that this activity would be completed by March 19. Resp. Exh. 54.

<sup>47</sup> Some drawing preparation work was being done by A&N during this early period. For example, the record suggests that by the end of January, A&N had performed some initial work preparing draft drawings of the Palm House monitor trusses, as shown in a sketch dated January 30, 1999. App. Exh. 113 at A&N 01 001457.

<sup>48</sup> The record shows that the shop drawings for the Palm House aluminum structure were only partially complete as of July 12, 1999, and work under this activity continued (although not on the as-built critical path) until August 22, 2000. App. Exh. 92 at 17.

## b. Clark Contentions

Prior to this litigation, the only reason advanced by Clark (in its request for equitable adjustment and appeal) and by Clark's CPM expert, Mr. Kern for assigning responsibility for the delay to AOC in this first subperiod was the flattened lacing angle design error. REA at 3; App. Exh. 92 at 5-8; C4 Supp. 08 00014-15. During the litigation, Clark modified its position as to the reasons for the delay in the preparation of the shop drawings for the Palm House aluminum structure, and now points to other asserted deficiencies in the design drawings and to AOC's alleged failure to timely and reasonably respond to the contractor's requests concerning these deficiencies as additional reasons for the delay in completing this activity. The design deficiencies now alleged by Clark as causing the delay during this first period are:

- a. Flattened angle: The drawings specified that lacing angles, made of tempered, 6061-T6 aluminum, be flattened at the ends, although the material was too brittle to be flattened;
- b. Geometry issues: The drawings did not provide dimensions between, and elevations for, the twenty Palm House steel columns and incorrectly showed a 45 degree angle relationship at the corners of the Palm House steel columns;
- c. The design drawings did not provide radii for the Palm House corner AC trusses;
- d. The purlin locations/dimensions shown for the AC trusses were not correct;
- e. The design drawings were inconsistent in depicting the orientation of chord members in the monitor trusses, with some drawing details showing the toes of members pointing up and other sections of the drawings showing the toes of the members pointing down;
- f. There were two different dimensions shown for the top of the monitor;
- g. AOC failed to remove all existing aluminum from atop the Palm House steel columns, as shown in the design drawings, and changes in the lead paint abatement procedures delayed obtaining bolt-hole locations from the steel column splice plate since they were obscured by the existing aluminum material; and
- h. The drawings showed two half-inch (one inch total) plates from the AC trusses coming together and being inserted into a three-eighths inch space between the chords of the BB truss.

App. PFF ¶¶ 64-94, 279-88

## c. Geometry Issues

We find that the geometry issues were the major contributor to the delay in the preparation of the shop drawings during this period. Clark asserts that AOC was responsible for this delay because it was caused by defective and incomplete designs. We disagree and, for the reasons stated below, find that Clark was responsible for this delay.

At its initial January 19, 1999 meeting with Standard Iron, A&N reviewed the Palm House design drawings and noted that the drawings did not provide dimensions between the Palm House structural steel columns (columns 1 through 20).<sup>49</sup> A&N requested that Standard Iron provide those dimensions, which were necessary to begin the preparation of the drawings. H.Tr., Miranda, 17:15-16, 162-63. H.Tr., Torchio, 15:223.

On January 25, Standard Iron provided A&N with the dimensions for the 20 Palm House steel columns (including distances between each of the columns) obtained in a field survey performed by Standard Iron. C4 Supp. 21 0146-51. This survey was not performed by a licensed surveyor, as contemplated by the pertinent contract requirements (quoted below), but by Standard Iron's project manager. D.Tr., Dobbs, 79-81. This "first survey," as transmitted, did not label the columns and was rotated where the top of the survey was facing south instead of north. Resp. Exh. 56. According to A&N, this orientation error, which was not obvious from the face of the document, required A&N to "redraw all work done [and] also . . . to make new design layouts in order to come up with dimensions and angles that could be used for Detailing."<sup>50</sup> A4 Supp. R00227.

Anthony Miranda, the president of A&N, testified that the first step in preparing the shop drawings for a "complicated" structure, such as the Botanic Garden Conservatory, was to do a preliminary layout. Mr. Miranda testified that it was necessary to do the preliminary layout and get Palm House structure to "close out," that is, determine whether the columns and connections are in the places shown and connect as one goes around the structure, before other work could be done.<sup>51</sup> H.Tr., Miranda, 17:10-13. In early February 1999, using the steel column dimensions provided in the "first survey" and the 45-degree angle relationship of the corner trusses shown in DMJM's drawings, A&N found that the structure did not "close out." *Id.* at 17:16-17, 21-25.

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<sup>49</sup> Since A&N so readily noticed upon its first view of the drawings that these dimensions, which were necessary to do its work, were lacking, it seems that to the extent this can be considered a design defect, it was patent. Under such circumstances, a contractor has a duty to "consult the government's representatives if he intends to bridge the crevasse in his own favor [and] [h]aving failed to take that route, [the contractor] is now barred from recovering" on a claim based on a patent defect. *Beacon Constr. Co. v. United States*, 161 Ct. Cl. 1, 7, 314 F.2d 501, 504 (1963); see *Troise v. United States*, 21 Cl. Ct. 48, 68 (1990).

<sup>50</sup> The record shows that A&N did not recognize the incorrect orientation of this initial field survey until A&N received a later survey performed by CTL Engineering, Inc., which labeled the Palm House columns such as to identify the correct orientation of the Palm House. Compare Resp. Exh. 56 with A4 Supp. R00227 ("When we received the original survey we found out later it was rotated 180 degrees with North pointing in the wrong direction.") While Mr. Miranda testified that this error only concerned the perimeter non-Palm House columns, H.Tr., Miranda, 17:148, this testimony is not consistent with the contemporaneous documents in the record, including Mr. Miranda's own March 29, 2000 memorandum, which indicate that this error involved the Palm House columns. A4 Supp. R00227. We find that this orientation error was solely Clark's/Standard Iron's responsibility and caused A&N to have to redraw work that it had done before it realized the error.

<sup>51</sup> Mr. Miranda testified that "[w]hen you are trying to close out a structure that means that when you draw the structure using the dimensions you are given, as you work yourself around, every column has to work out to the location shown by the dimensions." H.Tr., Miranda, 17:23.

While doing the preliminary layout, A&N also noted that AOC's design drawings did not show exactly the location (elevation) of the top of the existing truss columns and did not provide the specific locations of the bolt-holes in the splice plates that would be used to connect the new structural aluminum trusses to the existing steel columns. *Id.* at 17:14-15.

A major reason that the structure failed to "close" in the preliminary layout was that the 45-degree angle relationship at the corners of the structure shown on the DMJM design drawings was incorrect, in that the actual angle relationship was between 47.1 and 47.6 or 47.7 degrees. *Id.* at 17:53, 160; R4, Drawing A109. The angle error relationship was a function of the fact that a number of columns were not in the locations shown on the design drawings; that is, some columns, as-built, were as much as 4 to 6 inches from where they were shown on the drawings. *See* H.Tr., Miranda, 17:152-57, 160.

Standard Iron was notified of the geometry problems on February 3, when A&N informed Standard Iron that it could not get the Palm House layout to close, and that it needed "clarification of the size and location of skewed columns in comparison with this layout, the design, and [Standard Iron's] field measurements."<sup>52</sup> C4 Supp. 21 0234-238. As of February 15, A&N could not draw the Palm House bow trusses because it did not have elevations or dimensions for those trusses, and decided to detail the monitor trusses.<sup>53</sup> H.Tr., Miranda, 17:39-40. On February 16, Clark authorized Standard Iron to hire CTL, a consulting engineering firm, to perform a second field survey of the dimensions of the Palm House steel columns. C4 Supp. 21 0295. The record contains no evidence that AOC was notified of the geometry issues or of the survey of the existing columns.

Clark sent CTL's "first" report on the Palm House column layout to Standard Iron on February 26. C4 Supp. 21 0374-380. A subsequent CTL drawing, dated February 28, provided top and bottom column dimensions. C4 Supp. 21 0390. Although CTL provided detailed measurements between the columns at the end of February 1999 (the so-called "second survey"), A&N performed the layout at the end of March 1999 using "nominal dimensions,"<sup>54</sup> as reflected in A&N's internal memorandum dated March 26.<sup>55</sup> H.Tr., Miranda, 17:51-52; C4 Supp. 21 0689.

The record shows that at this time, however, A&N did not have elevations for the Palm House structural steel columns, which Mr. Miranda testified were needed to prepare the drawings, H.Tr., Miranda, 17:14-15, 47-48, and which could be obtained by the required as-built survey. On April 8, Standard Iron forwarded to A&N additional Palm House as-built column elevations

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<sup>52</sup> A skewed column is a column on an angle in relationship with the rest of the building. H.Tr., Miranda, 17:159. It was for these skewed columns that the drawings showed a 45-degree angle relationship.

<sup>53</sup> The bow trusses referenced are also called arch trusses.

<sup>54</sup> Nominal measurements were an average of the various dimensions between the columns. H.Tr., Miranda, 17:52.

<sup>55</sup> We are unsure why A&N had to use nominal measurements, given that it had already received the CTL survey data showing actual measurements.

(columns 1 through 20), as surveyed by CTL. C4 Supp. 21 0842. Standard Iron forwarded revised as-built elevations for Palm House columns 1 through 20 to A&N on April 13, which changed a number of elevations on the survey that had been forwarded to A&N on April 8.<sup>56</sup> C4 Supp. 21 0859-861.

We find that as of April 13, one month after the as-planned scheduled drawing submission date, the Appellant first had the information necessary to proceed with the drawings. As indicated, based upon its use of nominal measurements and the field surveys, A&N then prepared the layout and shop drawings, despite the erroneous 45-degree angle shown on the contract drawings, and without providing notice of these problems to AOC.

Clark argues that the significant delay in preparing the drawings was caused by the lack of geometry information for the Palm House columns and the identification of incorrect angle relationship at the corners of the Palm House steel columns, and that the delay caused by these problems should be charged to AOC because DMJM's drawings were defective (*i.e.*, the erroneous 45-degree angle) and incomplete (*i.e.*, did not show the dimensions or elevations).

However, we find, in the absence of evidence to the contrary, that Clark never advised AOC of these geometry issues or the impact they were having on its schedule, but instead, through its subcontractors, worked these problems out on its own (without specifically advising AOC that this critical path item was falling behind schedule). Apparently, it was only during this litigation that AOC was first advised of these alleged design problems and the adverse impact they had on A&N's timely preparation of the drawings.

While, as discussed above, delay caused by defective specifications is generally compensable, if an alleged design defect is not reported by the contractor to the government within a reasonable period of time after discovery of the defect, and the contractor instead works out the problem itself, the contractor cannot place responsibility for the delay on the government for time expended in reaching a solution. *Kings Elecs. Co., Inc.*, 169 Ct. Cl. 433, 438-39, 341 F.2d 632, 636 (1965); *Ferguson Propeller, Inc. v. United States*, 59 Fed. Cl. 51, 64 (2003); *R. P. Richards Constr., Inc.*, DOTBCA Nos. 4019 *et al.*, September 13, 2001, 01-2 BCA ¶ 31,594 at 156,146; *Environmental Devices, Inc.*, ASBCA Nos. 37430 *et al.*, May 24, 1993, 93-3 BCA ¶ 26,138 at 129,935; *Reese Mfg., Inc.*, ASBCA No. 35144, November 10, 1987, 88-1 BCA ¶ 20,358 at 102,947 (agency cannot be charged for the period of such delay until the alleged defective specification is reported to it); *Axel Elecs., Inc.*, ASBCA No. 18990, December 10, 1975, 76-1 BCA ¶ 11,667 at 55,663-64 (same).<sup>57</sup> In such circumstances, the contractor is chargeable

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<sup>56</sup> Clark's comment in its reply brief that the "height of the columns could not be resolved" until sometime later is in error. App. Reply Brief ¶ 31.

<sup>57</sup> This rule does not flow from any contract notice requirement, such as the Changes clause, for which notice requirements are not strictly enforced. See *Hoel-Steffen Constr. Co. v. United States*, 197 Ct. Cl. 561, 570-73, 456 F.2d 760, 766-68, (1972) (notice requirement not enforced where agency had actual knowledge of defective design); see also *R.P. Richards Constr. Inc.*, *supra*. Rather, the contractor's obligation to timely advise the government of defective specifications, instead of working the problems out itself, as a precondition to holding the government responsible for the resultant delay has been characterized as being a matter of fairness, *Axel Elecs., Inc.*, *supra* at 55,664; equitable estoppel, *Casson*

with the responsibility for the delay, not the government. *R.P. Richards Constr., Inc., supra*, at 156,146 (excusable delay not warranted where such timely notice is not given); *Reese Mfg., Inc., supra*, at 102,947 (same). Thus, the responsibility for any delay in the preparation and submission of the Palm House aluminum structure shop drawings during this period resulting from the resolution of these unreported geometry issues cannot be charged to AOC, but must be charged to Clark.<sup>58</sup>

The failure to report these problems to AOC by Clark is not surprising, given that, as Clark contemporaneously recognized, it was Clark's contractual obligation to survey the columns to determine such matters as dimensions between, and elevations of, the Palm House columns in preparing the drawings. Specifically, the contract provided under section 01520, "Structural Steel," which was applicable to this work, that the contractor was to "[e]mploy a licensed land surveyor registered in the District of Columbia for accurate erection of structural steel and to check alignment of existing steel." R4, K0477. Similarly, the contract provided in section 01540, "Structural Aluminum," that the contractor was required to "[e]ngage a land surveyor registered in the District of Columbia for accurate erection of structural aluminum. . . . Check elevations before erection work proceeds, and report discrepancies to Architect." R4, K0483. Also, note 1 of the General Notes on Drawing S001 informed that "[p]rior to the beginning of the work, the contractor shall verify all dimensions of existing work, and location of utilities." R4, Drawing S001, note 1.

Clark's contractual obligation to survey existing conditions was reflected in Standard Iron's subcontract with Clark, which obligated Standard Iron to "field measure conditions necessary to ensure correct fabrication of materials provided under this Agreement."<sup>59</sup> C4 Supp. 08 1456, 1476. In response to Standard Iron's request for approval to purchase Palm House material prior to approval of the Palm House shop drawings, Clark's senior project manager wrote Standard Iron in a letter dated June 17, 1999, that "Standard Iron [had] not performed all necessary survey[s] of existing structure per 05120.3.1." Clark further wrote:

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*Constr. Co., Inc.*, GSBCA Nos. 4884 *et al*, April 22, 1983, 83-1 BCA ¶ 16,523 at 82,130; *Powers Regulator Co.*, GSBCA Nos. 4668 *et al*, April 30, 1980, 80-2 BCA ¶ 14,463 at 71,320-21, mitigation, *Powers Regulator Co., supra*, at 71,320-2; or the contractor acting as a volunteer, *JGB Enterprises., Inc.*, ASBCA No. 49493, August 20, 1996, 96-2 BCA ¶ 28,498 at 142,313.

<sup>58</sup> Clark's actions in failing to promptly inform AOC of these design issues was also inconsistent with paragraph 3 of the General Conditions of the contract, which stated:

The Contractor shall promptly inform the Contracting Officer, in writing, of any discovered errors, omissions, discrepancies, conflicts or ambiguities in the contract documents before proceeding with any work affected by such factors. Failure to do so will be at the risk of the Contractor.

R4, K0032.

<sup>59</sup> In addition, we note that when Clark authorized CTL to proceed at a cost of \$3,000 on February 17, C4 Supp. 21 0316, it deducted this amount from Standard Iron's subcontract with Clark, which indicates that Clark and Standard Iron believed these survey requirements were Standard Iron's and Clark's contractual responsibilities. See H.Tr., Torchio, 15:226.

While I recognize that the lacing angle issue has impacted partial portions of the Palm House truss design work, I recognize also that Standard Iron has not provided the required submittals and survey information in accordance with the original project schedule. Consequently, Standard Iron is responsible for a portion of the total delay to the Palm House aluminum work.

C4 Supp. 21 1390. Similarly, Clark's project manager informed Standard Iron, by letter dated June 22, 2000, that

The restoration of the [United States Botanic Garden] or any historical restoration project requires a careful review of the existing structure prior to beginning fabrication of new material. Standard Iron is required per specification section 05120.1.3.C and section 05140.1.2.C to coordinate all work with adjoining and adjacent work. Standard is required per specification section 05120.3.1A and section 05140.3.1A to conduct field surveys of the existing structure. This survey serves to identify the conditions, locations, elevations, etc. of existing members, beams, columns, trusses, etc. Using field survey information, Standard Iron should have detailed and fabricated your steel and aluminum members to fit existing conditions. Standard Iron's failure to detail your work in this manner is solely Standard Iron's responsibility.

A4 Supp. R00788.

We conclude that, through April 13, 1999, preparation of the shop drawings was significantly inhibited because of the need to resolve the geometry issues, including those affected by the erroneous designation in the design drawings of a 45-degree angle relationship at the corners of the structure. However, given the acknowledged contract requirement that Clark conduct the as-built field surveys that resolved these issues, and Clark's failure to advise AOC of these problems and decision to work these problems out itself, any delays caused by these problems were solely the responsibility of Clark.

We also find that because it took so long to resolve these issues, the preparation of the shop drawings was significantly delayed after April 13 because the drawings still had to be detailed after that date to incorporate the resolution of the geometry issues. Indeed, Clark now characterizes the geometry problems as being the "principal cause of delay" in this period. App. PFF ¶ 281.

#### d. Other Geometry Related Design Defects

Clark also identified during this litigation four other alleged design defects, which Clark asserts were geometry related and delayed its preparation and submission of the shop drawings in the same time frame as the geometry issues discussed above were being encountered. These four alleged design defects are (1) the locations/dimensions of purlins for the AC trusses were not

correct,<sup>60</sup> (2) the design drawings did not provide radii for the AC trusses,<sup>61</sup> (3) the design drawings inconsistently depicted the orientation of the chord members in the monitor trusses with some chords' toes pointing upward and other chords' toes pointing downward,<sup>62</sup> and (4) there were two different dimensions shown for the top of the monitor. App. PFF ¶ 280; H.Tr., Kern, 21:45-46. Clark suggests that until DMJM clarified these particular matters the detailing work could not be done. See App. PFF ¶¶ 75, 77, 90.

However, based on our review of the record, we find that these alleged design defects were not brought to DMJM's or AOC's attention at that time.<sup>63</sup> Nor does Clark specifically state how these problems were resolved (or explain exactly how they affected the work). We find, in the absence of any contrary credible explanation by Clark, that A&N/Standard Iron/Clark were able to work out these problems itself without notifying AOC or DMJM. As discussed previously, under such circumstances, Clark cannot recover damages for any delay caused by these alleged problems. *Kings Elecs. Co., Inc.*, 169 Ct. Cl. at 438-39.

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<sup>60</sup> According to Mr. Sullivan, "The spacing was given on truss AA, truss AB, and truss AC and the spacing on AC was less than AA and AB and it just didn't--the trusses or the purlins wouldn't have been level. It wouldn't work." H.Tr., Sullivan, 12:217.

<sup>61</sup> According to Mr. Miranda, "We needed to know what the radius of the bottom parts were for this truss for us to start, and there was no radius given on the AC truss." H.Tr., Miranda, 17:28. This problem was noticed by A&N by February 3, 1999, and reported to Standard Iron (but not AOC). C4 Supp. 21 0234-38.

<sup>62</sup> According, to Mr. Torchio, "The contract drawings show the orientation of the truss core members differently on different drawings. One of the S drawings [*i.e.*, structural design drawings] that shows the toes up on the top corners, the angle toe up, on the other one it shows the toe down. There was a conflict as to which way they [*i.e.*, AOC] wanted it done." H.Tr., Torchio, 15:238-39.

<sup>63</sup> Mr. Torchio testified that these matters were "informally" resolved by a Standard Iron representative making phone calls to Standard Iron's representatives at the job site in Washington, D.C.; Mr. Torchio was "fairly confident" that the Standard Iron representatives spoke to Kevin Sullivan, Clark's project manager. H.Tr., Torchio, 15:243-44. Mr. Sullivan recalled that Clark obtained the information to resolve these asserted design errors by the beginning of March of 1999, but he thinks that "it wasn't necessarily provided by DMJM. It was kind of a cooperative thing. We were exchanging some information with, it was more through the AOC." H.Tr., Sullivan, 12:220. Neither Mr. Sullivan nor any other witness provided any elaboration of Mr. Sullivan's nonspecific recollection (whose testimony as to the casual resolution of these issues suggests that they did not have the serious impact now claimed). Clark has pointed to, and we have found, no contemporaneous documentation in the record that supports Mr. Sullivan's recollection that this information was informally provided by AOC, and we find it unlikely that these asserted design errors by DMJM were informally and verbally resolved through contacts with unnamed AOC individuals without input from DMJM, which prepared the assertedly defective drawings. Thus, we do not credit Mr. Sullivan's testimony that these issues were resolved by input from AOC. As indicated below, the record evidences that Standard Iron was not, as a general rule, bringing these design problems to Clark's or AOC's attention during this time frame.

e. Palm House Column Splice Plate Hole Locations

Clark also complains that the shop drawings of the Palm House main arch trusses were delayed because AOC's design drawings did not provide bolt-hole locations on the splice plates at the top of the Palm House steel columns. The Palm House design provided for the main arch trusses to be bolted to the steel columns at existing hole locations in the columns and through a splice plate. H.Tr., Miranda, 17:35-36. Although the Palm House design reflected that all of the former aluminum structure had been removed from the steel columns, part of the old aluminum structure remained attached to the steel columns at the splice plates at the top of the Palm House steel columns. H.Tr., Sullivan, 12:223-24. This existing aluminum obscured the precise location of the bolt-holes, such that A&N could not detail the location on the shop drawings. *Id.* at 12:225-26. Clark argues that changes ordered by AOC in the lead paint abatement procedures delayed Clark's planned lead paint abatement, which prevented Clark from obtaining the bolt-hole locations from the top of the steel columns, since these locations had lead paint that needed to be abated before the existing aluminum could be removed. App. PFF ¶ 287.

The record shows that A&N was aware, by the beginning of February 1999, that the design drawings did not show the precise location of the bolt-holes for the Palm House steel columns. H.Tr., Miranda, 17:14-15. From February through April, A&N noted its need for the precise hole locations in the existing steel columns to Standard Iron and Clark, but AOC was not then specifically notified of Clark's need for this information.<sup>64</sup> On April 20, A&N reported to Standard Iron that, "[p]er our meeting today," A&N would receive a template of existing splice plates, and that A&N would detail the connections, except for the holes in the existing columns. "These [holes] will have to be matched by new plates," and A&N will "'slot' these matched holes for field adjustment to correct height, then bolt with high strength bolts." C4 Supp. 21 0932. The following day Standard Iron requested input from Williams Steel Erection Co., Inc. (a sister company to Standard Iron), the Standard Iron subcontractor responsible for the aluminum structure erection, regarding a number of options regarding whether to obtain a template for Palm House column connections or whether to obtain longer truss material with holes to allow later trimming and drilling. C4 Supp. 21 0935.

It was not until April 28, when Clark submitted RFI No. 126, that the record evidences that AOC was specifically notified of the existing aluminum atop the steel columns. RFI No. 126 stated in pertinent part:

[i]t appears that original aluminum pieces remain atop each palm house column. These pieces are not indicated on the contract documents. See attached photo. Additionally the existing steel columns were not cut at the elevations shown on dwg F8/F14 on S-405. Please advise what action should be taken.

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<sup>64</sup> As indicated below, AOC was provided a copy of minutes for the February 12, 1999 coordination meeting (attended by Clark, Rough Brothers and Standard Iron), which mentions this issue. The vague reference in these minutes to this issue hardly put AOC on notice that a contract change was requested to resolve this issue. See C4 Supp. 21 0278-80.

C4 Supp. 02 00816. On May 7, Clark forwarded to AOC Standard Iron's facsimile request for direction from AOC regarding "cleaning up the existing columns in the Palm House," by which Clark notified AOC that truss shop drawings could not be completed until the old aluminum pieces were removed and the exact whole locations surveyed. C4 Supp. 21 1012.

On June 1, AOC responded to RFI No. 126, stating:

[t]he new aluminum replicates the existing aluminum. The pieces need to be removed while retaining the steel splice plate. The new aluminum fastens into the existing steel splice plate, so field measurement is recommended. Refer to Change Order No. 19.

C4 Supp. 02 00813. AOC issued Change Order No. 19 on June 1, 1999 to provide for the removal of existing structure at top of Palm House columns. C4 Supp. 21 1282. This was considered to be a design error by AOC. C4 Supp. 21 1283.

Although Clark argues that the missing bolt-hole information prevented the contractor from preparing the shop drawings as it originally planned, the record shows that Clark/Standard Iron/A&N determined to not address this detail in the drawings, but, as early as April 9, 1999, resolved the missing bolt-hole information by drawing the Palm House arch trusses without the bolt-hole locations. H.Tr., Miranda, 17:65-66; App. Exh. 73 at 4. Specifically, Mr. Miranda testified that A&N "actually drew the trusses. . . and left the tops blank." H.Tr., Miranda, 17:66. A&N drew the truss chord members longer than required to allow for "field trim[ming]" (that is, long enough to allow for the chords to be cut to the correct length) and without the holes detailed on the drawings to allow the holes to be drilled in fabrication or in the field. H.Tr., Miranda, 17:108-10; *see also* D.Tr., Randall Keith (A&N's Chief Draftsman), 37 ("Our final detail involved adding an extra trim length to the truss and leaving out holes to be field drilled").

We find that Clark has not met its burden of showing how its preparation and submission of the structural aluminum shop drawings were delayed prior to July 12 because of the missing information (*i.e.*, the hole locations) that it did not use in completing this aspect of the drawings during this subperiod. In this regard, as discussed above, the record establishes that through April 13 Clark's preparation of the arch truss shop drawings was delayed because Clark did not have elevations for the steel columns to which the arch trusses would be attached, H.Tr., Miranda, 17:14-15; the elevation measurements were obtained by April 13 when Clark performed its contractually obligated as-built survey. C4 Supp. 21 0859-861. As indicated above, even before that date, A&N determined to prepare the shop drawings for these trusses without the bolt-hole information, which allowed the preparation and submission of the shop drawings. Although, as discussed below, the missing bolt-hole information may have affected Clark's fabrication of the arch trusses during the fabrication period when this matter was actually addressed by Standard Iron, Clark has not shown how this missing information delayed Clark's preparation and submission of drawings during Period 1.

#### f. One-Inch AC Truss Plates Into Three-Eighths Inch BB Truss Space

Clark complains that AOC's design for connecting the AC (Palm House corner) trusses to the BB (Monitor) truss was defective because the connection was shown to consist of two AC truss plates, each one-half-inch in width, going into a three-eighths-inch space between the chords of the BB truss. H.Tr., Miranda, 17:40, 44-45; H.Tr., Sullivan, 12:221; App. Exh. 72 at 2. Clark thus submitted RFI No. 98 on March 19 to AOC requesting information on how to control the spread of the truss BB chord members.<sup>65</sup> C4 Supp. 02 00299-301. Attached to the RFI was one of the five diagrams prepared by A&N on March 10 asking Standard Iron for design information.

On April 27, AOC responded to Clark's RFI No. 98, stating, "[d]uring fabrication, bend the chord members of truss BB at Q12-I/S402 to accommodate trusses AC." C4 Supp. 02 00298. A&N did not use this solution in its shop drawings, but instead used its own "Y-type" design in its shop drawings, because it believed that AOC's response was inappropriate. H.Tr., Miranda, 17:68-70; App. Exh. 73.

Here too, Clark has not met its burden of demonstrating that its preparation and submission of shop drawings was delayed. There is no evidence in the record that establishes that RFI No. 98 issue delayed the work for any particular period of time. Although it is true that Clark believed that the connection of the AC trusses to the BB truss reflected a design error, it resolved this concern without regard to input from AOC.

#### g. Flattened Angle

Clark also complains that preparation of the shop drawings was delayed by AOC's defective design with respect to the lacing angles in the Palm House arch trusses. Clark argues that it notified AOC of the problem of flattening the lacing angles in February 1999, and that AOC and DMJM agreed to the use of a flat bar in lieu of flattening the lacing angles, and that AOC should therefore be responsible for the attendant delay based on its defective design and its renegeing on this fix of this defective design. App. PFF ¶ 82

The arch trusses are composed of aluminum chords (the outer edges of the truss) tied together by diagonal "lacing angles." AOC's design with regard to the arch trusses specified lacing angles, which were to be flattened at the ends of the angles to allow connection to the truss chords and were to be constructed with 6061-T6 aluminum.<sup>66</sup> R4, Drawings S401, S405; R4, K0482; H.Tr., Miranda, 17:30; Sullivan, 12:239-40. Some time prior to February 12, 1999, Standard Iron found that the lacing angles, as designed, were too brittle to be flattened. H.Tr., Torchio, 15:256; 16:140.

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<sup>65</sup> The RFI stated that drawing S402 "calls for (2) ½ [inch] [plates] 'doubled' and bent to receive trusses 'AC'-yet-Gusset [plates] in 'BB' above\* are only 3/8 [inch] [thick]. How do we control the spread of chord members? 5/8 [inch] difference." C4 Supp. 02 00299-301.

<sup>66</sup> The lacing angle is actually a length of aluminum that has been angled into a 90-degree v-shape. H.Tr., Sullivan, 12:239-40.

The record shows that on February 12, at a coordination meeting between Clark, Standard Iron, and Rough Brothers, many issues were discussed, including the geometry, the holes for the spliced plate, and flattened angle issues. At the meeting, several options to flattening the aluminum lacing angles were discussed, including a "T" section, double angles, or a flat bar. See H.Tr., Torchio, 15:257-58; C4 Supp. 21 0354. At that meeting, Clark decided to propose the use of a "T" section of aluminum to connect the lacing angles to the aluminum trusses, rather than flattening the aluminum lacing angles, and stated that an RFI would be prepared by Standard Iron. C4 Supp. 21 0278-280.

A copy of the February 12 coordination meeting minutes was provided to AOC at the February 16 owners meeting. However, contrary to Clark's arguments, these coordination meeting minutes do not identify specifically the problem with flattening the ends of the lacing angles or suggest that it was a design defect; rather, these February 12 meeting minutes only provide: "RefF8/S401 T section in lieu of lacing angle 2-1/2x2-1/2. [Standard Iron] to submit RFI." C4 Supp. 21 0279. This could reasonably be interpreted as Clark's preference to construct to a design different from that specified (for a T-section, not the flat bar which Clark asserts was the agreement of the parties), see H.Tr., Heroy, 25:119-22 (meeting minutes indicated a desire to use a "T" section rather than indicating a design error), and an assignment of responsibility to Standard Iron to prepare an RFI on the matter (which was only done on March 30).<sup>67</sup>

Mr. Sullivan also testified that he spoke to representatives of AOC, James Krapp and Mark Tartaro, at the owners meeting about "this issue" and about A&N's proposal to use a T-section instead of flattening the angles. According to Mr. Sullivan, Mr. Tartaro indicated "DMJM would get [Clark] an answer on that." H.Tr., Sullivan, 12:240-42. Mr. Sullivan further testified that subsequently, but before February 22, he had a discussion while walking the site with Mr. Tartaro and someone employed by DMJM (whom Mr. Sullivan could not recall), and "that was where the suggestion of using a flat bar [instead of the flattened lacing angle] came up."<sup>68</sup> *Id.* at 12:242-43, 13:113. Mr. Sullivan also testified that Clark decided to execute RFI No. 104 on March 26 because Clark "thought [there] was an agreement to use a flat bar in lieu of the contract specified angle," and that "we were getting an indication then from Jim [Krapp] and Mark [Tartaro] that all these conversations that we had prior to that to resolve this issue didn't exist or that they didn't agree with is I guess a better way to put it." H.Tr., Sullivan, 12:247.

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<sup>67</sup> In its request for equitable adjustment and appeal of the contracting officer's final decision, Clark asserted or indicated that a representative of AOC was present at the February 12 meeting and agreed to use of a flat bar in lieu of the flattened angle. REA, attach 1, at 7; C4 Supp. 08 00015. This is not only inconsistent with the minutes of that meeting, which indicate agreement on a T-section rather than a flat bar, but the record is clear that AOC was not present at the February 12 coordination meeting. C4 Supp. 21 0278.

<sup>68</sup> As indicated above, this alternative was previously discussed at the February 12 meeting not attended by AOC or DMJM. C4 Supp. 21 0354.

Mr. Sullivan did not testify that he identified the flattened angle issue to AOC or DMJM as a design defect.<sup>69</sup>

We find no evidence that AOC or DMJM was advised in February that this issue involved a design defect and that Clark therefore expected AOC to provide a solution to this problem. Crediting Mr. Sullivan's testimony, we find that Clark's request could well have been interpreted by AOC or DMJM as an informal request for a change in the design for Clark's benefit. Even though Mr. Sullivan may have believed there was an "agreement" by AOC and DMJM to use a flat bar, he only testified that someone from DMJM or Mr. Tartaro "suggested" the use of a flat bar in lieu of the flattened lacing angle.<sup>70</sup> While Clark argues that we must accept Mr. Sullivan's testimony that there was an agreement to use a flat bar because AOC provided no rebuttal witnesses to his testimony, the record otherwise shows that AOC and DMJM did not believe there was any such agreement.

In fact, when on March 30,<sup>71</sup> Clark finally submitted RFI No. 104 to AOC, stating:

Concerning the bow truss diagonals: It was suggested and verbally agreed to at early meetings to use 5" x 3/8" flat bar in lieu of the flattened angle. We need verification to proceed using the flat bar lacing. This type of lacing is used in numerous other places on this structure.

C4 Supp. 21 0748, AOC, in a letter signed by Mr. Krapp, promptly replied to Clark's RFI No. 104 on April 14 that "[t]here is no record/recollection of the 'verbal agreement' to use flat bar in lieu of flattened angle as required by the contract documents. The flattened angle shall be used." C4 Supp. 02 00951. DMJM's contemporaneous documentation also reflects that it was unaware of any such agreement. C4 Supp. 21 1515.

All subsequent file documentation referenced by the parties is consistent with a finding that AOC and DMJM did not believe they had made any such agreement. At the end of April, Clark explained to AOC that the lacing angles could not be flattened as the design directed, and AOC asked whether Clark had attempted to form the lacing angle using untempered aluminum. C4 Supp. 21 0957. On April 28, Clark submitted RFI No. 125 with an attached sample of a

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<sup>69</sup> As indicated above, prior to this litigation, Clark erroneously alleged that AOC agreed to this fix at the February 12 coordination meeting. Clark first advanced the testimony of Mr. Sullivan to demonstrate this agreement during this litigation.

<sup>70</sup> We note that A&N believed that there was an "agreement," when it requested verification to use the flat bar on March 26, 1999, stating that "[i]t was suggested and verbally agreed to at early meetings to use 5 [inch] x 3/8 [inch] flat bar in lieu of the flattened angle." C4 Supp. 21 0685; H.Tr., Miranda, 17:54-55. (These were the same words in Clark's RFI on the subject to AOC.) We also note that A&N was not at any meeting with AOC or DMJM on this subject, so this memorandum does not make clear who was the party that made the "suggestion" and who were the parties to the "agreement."

<sup>71</sup> Clark argues that there was no reason to request an RFI earlier because it believed it had an agreement and that in any case it could not earlier begin work on this aspect of the design until the geometry issues were resolved. See H.Tr., Kern, 21:47-48.

lacing angle that Clark had attempted to flatten, and stated that the "T6 aluminum was too hard to form," and Clark requested that AOC provide an acceptable alternative. C4 Supp. 02 00819. On May 4, AOC asked Clark whether it had attempted to use untempered aluminum, as AOC had earlier asked Clark. C4 Supp. 21 0981. On May 5, AOC responded to RFI No. 124 directing Clark "[a]s discussed during the April 27, 1999 progress meeting, the same procedure shall be tried using 'untempered' aluminum angle in an attempt to eliminate the angle cracks. Please advise the results of the flattening with the 'untempered' angle as soon as possible." C4 Supp. 21 0982. On May 6, Clark informed AOC that "samples of any untempered aluminum would require 8 weeks to procure." C4 Supp. 21 1004. All of this correspondence reflects that AOC and DMJM had not been sufficiently apprised in February of 1999 of the nature of the problem, nor had they agreed to any solution.

We find the contemporaneous documentation of AOC's and DMJM's position on this matter (that AOC had made no agreement) to be just as credible as Mr. Sullivan's testimony that he believed that there was an agreement, and draw no negative inference from AOC's failure to call rebuttal witnesses to reiterate what was already stated in the contemporaneous documentation. In this regard, Clark has pointed to no evidence, including trial or deposition testimony, where AOC or DMJM representatives in any way suggested there was an agreement by AOC or DMJM in February 1999 to use a flat bar in lieu of the flattened lacing angle.<sup>72</sup>

Thus, it appears that there was not a meeting of minds by the parties in February 1999 as to how the flattened angle issue should be addressed. While Mr. Sullivan testified with regard to this issue that Clark's "goal isn't to go on a job and generate RFIs on every little issue," H.Tr., Sullivan, 12:247, we find it inexplicable that Clark/Standard Iron would not have promptly generated an RFI on a matter that it now asserts was a design defect that allegedly significantly delayed the critical path of the project, particularly where it stated it would do so at its February 12 coordination meeting.

AOC issued Change Order No. 27, "Truss Lacing Angle," dated June 22, to provide that truss lacing angle would not be flattened, but would be fabricated in accordance with an attached DMJM design (Sketch No. RD-S16) for attaching flat connecting plates to the angle. AOC's change order information form acknowledged that this was a design error. C4 Supp. 21 1435. On June 23, the change order was faxed by Clark to Standard Iron. C4 Supp. 21 1439. On June 30, Standard Iron transmitted Change Order No. 27 to A&N. C4 Supp. 21 1575-78. A&N subsequently revised its shop drawings to reflect DMJM's design (Sketch No. RD-S16) for the lacing angle. H.Tr., Miranda, 17:72.

While Clark and Mr. Kern attribute most of the delay during this subperiod to the resolution of this design defect because it was the "final piece" holding up the preparation of the key bow truss drawings, H.Tr., Kern, 21:63, Clark has failed to provide evidence establishing how much time this task took, or specifically identifying how and how much time the resolution of this issue delayed the preparation of the drawing package.

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<sup>72</sup> Since Mr. Sullivan testified that he was advised in March 1999 that Mr. Tartaro also did not remember any agreement, H.Tr., Sullivan, 12:247, we do not credit Clark's post-hearing suggestion that this problem was caused by Mr. Krapp not being aware of Mr. Tartaro's agreement. App. PFF ¶ 83.

Instead, we find that the resolution of the geometry issues, which was the responsibility of Clark, caused the bulk of the delay for this subperiod. As discussed above, Clark acknowledges that the geometry issues had to be resolved before the drawings could progress,<sup>73</sup> and we find that it then took some time to implement this resolution as well as the other miscellaneous design problems that Clark/Standard Iron elected to not report and to resolve itself. Moreover, the record shows that A&N was able to draw an alternative placeholder (that is, a flat bar of its own design), instead of the lacing angles, on the pertinent drawings pending resolution of this issue, and proceeded to preparing the shop drawings.<sup>74</sup> H.Tr., Miranda, 17:55, 81-82. This suggests that shop drawing preparation was not delayed by this design defect beyond the time needed to implement the revised DMJM design on the shop drawings. As indicated, Clark has produced no evidence specifically showing how or how much time the resolution of this issue impacted the preparation of the shop drawings.

The only evidence of the impact of this design defect was provided in the testimony of Mr. Heroy, who indicated that this problem only affected three drawings, and that the "back up information provided by Standard Iron" indicated that this adjustment to the drawings to reflect the revised lacing angle took 27 hours or approximately 4 days if only one person was working on it. H.Tr., Heroy, 23:201-02. Mr. Heroy thus determined that AOC was responsible for 4 calendar days of the delay in preparing the shop drawings. *Id.* Clark has provided no evidence rebutting Mr. Heroy's analysis, and, in the absence of countervailing evidence, we accept his opinion on this matter.

#### h. Comparison of Experts' Testimony

The initial windows analysis of Mr. Kern, Clark's CPM expert, for this subperiod focused solely on the flattened angle issue without mentioning any other design issues that may have affected the preparation of the shop drawings; his report assigned all but 41 of the 122 calendar days of the delay to AOC and found that the 41 days were "unresolved." App. Exh. 92 at 28; H.Tr., Kern, 21:47. During the litigation, Mr. Kern modified his opinion, based upon the additional evidence concerning the other alleged design defects, the totality of which Clark now claims caused the entire 122-day delay to be AOC's responsibility. H.Tr., Kern, 21:48. In assigning entire responsibility for the delay during this period to AOC, Mr. Kern testified that, in his opinion, there was not anything Clark or its subcontractors did that slowed the drawing preparation process, and that A&N had to "scurry around and find other work" while these problems were being resolved. H.Tr., Kern, 21:68-69.

We give little weight to Mr. Kern's testimony in this regard because, in considering the geometry related issues, he failed to consider or credit Clark's survey responsibilities under the contract or

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<sup>73</sup> Clark now recognizes that until the geometry issues were resolved, "the truss lacing angle problem was not a critical activity" and this only became a problem in March or April 1999. App. PFF ¶ 281.

<sup>74</sup> Mr. Miranda made the decision to use the flat bar placeholder by March 26, 1999. C4 Supp. 21 0685. This is consistent with Mr. Torchio's testimony that some time subsequent to the February 12 meeting the "selected option" of using a flat bar in lieu of the flattened lacing angle was communicated to A&N. H.Tr., Torchio, 15:257-58.

Clark's failure to bring these matters to AOC's attention. *See id.* at 21:125-30. As detailed above, the vast majority of delay during this subperiod was Clark's responsibility because it did not report to AOC what it now contends are design defects that undeniably delayed the preparation of the shop drawings, but which Clark instead elected to resolve itself.<sup>75</sup> While Clark suggests that a contractor cannot be expected to report every little problem, it is required to do so, rather than resolving the problems itself, if it expects to recover damages for any resultant delay, *see Kings Elecs. Co., Inc.*, 169 Ct.Cl. at 438-39, particularly where, as here, the affected work is being done off-site and AOC was not reasonably made aware of the progress of the work.

With regard to the remaining design issues that he asserts caused the delay in this subperiod, Mr. Kern provides very little analysis explaining the specific time impact on the accomplishment of this critical path activity. For example, Mr. Kern's testimony regarding RFI No. 98 (one-inch AC truss plates into three-eighths-inch BB truss space) was that this was design problem and DMJM did not provide an appropriate solution. However, he did not testify as to how or when it was resolved (as indicated above, A&N ignored the RFI No. 98 response and used its own solution) or how it specifically affected the preparation of the shop drawings (except to note that it prevented A&N from "detailing at least on the AC trusses at the top of the trusses where it ties into the monitor," without acknowledging that A&N then ignored AOC's response to RFI 98 and used its own solution), or how the length of time A&N took to prepare the drawings was specifically affected. H.Tr., Kern, 21:49-60. With regard to RFI No. 126 (palm house column splice plate hole location), Mr. Kern acknowledges that it was resolved by not addressing the issue in the shop drawing submittal; he does not identify any particular period of time during this first period that A&N's preparation of the drawings were delayed because of this design defect. *Id.* at 21:63-64. With regard to the flattened lacing angle issue, Mr. Kern's report and testimony indicates that the delayed resolution of this issue was the cause of delay during the subperiod after the geometry issues were resolved (around the first of April) because this was the "key issue that was holding up the release of the key drawings," and "this was the last problem to be solved before A&N can go ahead and release the drawings which they released on July 12." *Id.* at 21:46-47, 63; *see* App. Exh. 92 at 7-8. However, Mr. Kern's analysis references no specific evidence of how much time this delayed the shop drawing preparation in this subperiod.

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<sup>75</sup> The record evidences that Standard Iron was primarily responsible for the failure to report these design problems. In this regard, the record shows that A&N repeatedly made requests for information of Standard Iron regarding missing information and design problems, but in many cases Standard Iron apparently did not report these problems to Clark (we have found no contemporaneous evidence that it did so) and thus did not cause these requests to be passed on to AOC. For example, on March 10, A&N addressed five "questions still outstanding on the Palm House" to Standard Iron necessary to be answered to prepare the shop drawings, but only two of these questions (RFI 98 (March 19) and location of holes on top of trusses (May 7)) were passed on to AOC for resolution. C4 Supp. 21 0524-529. The record shows that, at the same time that Standard Iron and A&N were resolving these problems themselves for this critical path item, Rough Brothers was consistently reporting design issues for its work. Specifically, while Standard Iron generated only 4 RFI's to AOC relating to the preparation of Palm House shop drawings during the period ending July 12, 1999, Rough Brothers raised more than 40 concerns that were submitted to AOC as RFIs. *See* C4 Supp. 00001-01702.

Instead, Mr. Kern's analysis essentially merged all the claimed design defects, both those that were Clark's responsibility and those that may have been AOC's responsibility, together in asserting AOC was responsible for all of the claimed delay during this period. As indicated above, Mr. Kern provided no evidence or analysis about the particular time impact of any one of these design issues and failed to account for the delays caused by Clark's failure to timely resolve the geometry issues. This type of analytical approach essentially represents a "total time" approach of supporting delay claims, which does not meet Clark's burden to separate the delays for which it may have been responsible from those for which AOC was responsible so as to establish that activities on the critical path were delayed solely by government action with no concurrent delay. *See Morganti National, Inc. v. United States*, 49 Fed. Cl. at 134. Given that the contracting officer's decision on Clark's delay claim specifically noted that Clark's delay claim used a "total delay approach" and referenced the pertinent cases that disallow such an approach for meeting the burden of showing delay damages, *see* COD, ch. 1, at 4, Clark's failure to produce such evidence raises the reasonable inference that no specific delay attributable to any or even all, of the design defects during this period could be shown.

On the other hand, when Mr. Heroy was presented with sufficient documentation to make a judgment,<sup>76</sup> he developed and explained a methodology for measuring the delay impact of addressing the flattened angle defect in the preparation of the Palm House aluminum structure shop drawings in a situation where he could simply have asserted that the delay was concurrent (given the absence of any evidence by Clark that would allow the Board to find how much time to allocate to AOC for this defect during this period). Thus, we give more weight to Mr. Heroy's opinion in the matter.

#### i. Late Start of Activity

That Clark was responsible for the bulk of the delay in this subperiod is also supported by Clark's relatively late start of work on this critical path item. As indicated above, Mr. Kern's analyses suggest that actual preparation of the shop drawings did not commence until February 11, since that was the date on which his report stated this activity started.<sup>77</sup> We also note that although award was made on October 1, 1998, the preparation the Palm House aluminum structure shop drawings was only to commence on February 1, 1999. While this construction plan was certainly within Clark's prerogative, it appears that very little was done to ensure that this critical path activity would promptly commence on February 1. Specifically, the record evidences that Standard Iron first contacted A&N to perform this work on January 19, and that the as-built surveys, which Clark and Standard Iron were required to perform under their contract and subcontract, respectively, were not done until A&N noticed the patent problem of the lack of dimensions on the drawings. Thus, the record suggests a certain lack of urgency on the part of Clark/Standard Iron in commencing the performance of this critical path activity.

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<sup>76</sup> Mr. Heroy did not have access to any Clark, Standard Iron or A&N documentation prior to discovery under this litigation. H.Tr., Heroy, 23:131-32, 140-42

<sup>77</sup> Based on his review of the record, Mr. Heroy saw little evidence of any Palm House shop drawing activity until May 6, 1999, and concluded that the beginning of this activity had been delayed by 38 work days, which he found was Clark's responsibility. Resp. Exh. 62. This is the period during which Standard Iron/A&N was working out the geometry issues.

j. Unrealistic Duration for Activity

The record also shows that Clark's as-planned, baseline schedule of only 6 weeks for preparation and submittal of the Palm House shop drawings did not provide sufficient time to perform this activity, and did not account for the contract requirements of performing the as-built survey or coordinating the shop drawings with Rough Brothers, the glazing subcontractor.

A claim for delay damages based upon a windows CPM schedule delay analysis is only valid if the as-planned, baseline CPM schedule reflects reasonable durations; that is, the activities on the baseline schedule must be "feasible and attainable." *Sierra Blanca, Inc.*, ASBCA Nos. 30943 *et al.*, April 29, 1991, 91-2 BCA ¶ 23,990 at 120,081; *see Donohoe Constr. Co., supra*, at 148,813; *see also* Jon M. Wickwire and Richard F. Smith, *The Use of the Critical Path Method Techniques in Contract Claims*, 7 Pub. Cont. L. J. 1, 23-24 (1974); Jon M. Wickwire and Stuart Ockman, *Obstacles to Success: Use of Critical Path Method on Contract Claims--2000*, 19 *The Construction Lawyer* 12, 15 (October 1999). The government's approval of a contractor's proposed schedule does not establish that the schedule was reasonable. *See Hensel Phelps Constr. Co.*, ASBCA No. 49270, August 20, 1999, 99-2 BCA ¶ 30,531 at 150,796. Rather, the burden on proving that an as-planned schedule was feasible and attainable is still on the contractor. *Id.*; *see Wickham Contracting Co., Inc. v. Fischer*, 12 F.3d 1574, 1582 (Fed. Cir. 1994).

Here, the representatives of A&N and Standard Iron testified that 8 weeks for the preparation and submission of shop drawings was reasonable (not the 6 weeks shown on Clark's as-planned CPM schedule for this activity), H.Tr., Miranda, 17:11-12; Torchio, 16:9, and A&N conditioned its acceptance of the 8-week period on receiving answers to its requests for information, such as would be provided in the as-built survey. C4 Supp. 21 0085. Moreover, it is apparent that the time planned for this activity did not account for the associated tasks necessary to perform this activity: (1) performing the contractually required as-built survey before preparing the drawings--the accomplishment of which here accounted for a significant portion of the delay in this subperiod<sup>78</sup> and (2) satisfying the contractual obligation to coordinate the shop drawings with Rough Brothers, the glazing contractor, which turned out to be another time consuming task.<sup>79</sup> Furthermore, Clark has not pointed to where these activities are otherwise accounted for in its CPM schedule. Thus, we find that the time allocated for this critical path activity was insufficient and would not support Clark's recovery of delay damages in this period.

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<sup>78</sup> This issue was discussed above. The record suggests that Standard Iron did not plan to perform the required as-built survey, even though it was a contract and subcontract requirement, and only proceeded to do so because of A&N's request for survey information.

<sup>79</sup> This issue was also discussed in detail above. As indicated, Mr. Torchio testified that Standard Iron had not planned to coordinate its work with Rough Brothers until all of the shop drawings were completely prepared. *See* H.Tr., Torchio, 15:254.

#### k. Palm House Shop Drawing Preparation Delay Conclusion

Based on our review, we find that the work during this first subperiod was delayed 122 calendar days beyond the as-planned schedule's completion date of March 12, and that 118 calendar days of this delay are attributable to Clark. We find that AOC is responsible for 4 calendar days of delay because of the flattened lacing angle issue. While Clark asserts that the delay in this subperiod was solely the result of AOC's design defects, it simply has not met its burden of showing with specific evidence that its activities on the critical path were delayed for any specific periods of time solely by government action with no concurrent delay. *See Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198-99; *F.G. Haggerty Plumbing Co., Inc.*, *supra*, at 137,956-57.

#### 2. Alleged Manipulation of CPM Schedule

As indicated above, AOC was given very little notice of the issues that were delaying the critical path activity of preparing the Palm House structural aluminum shop drawings. In addition, the record shows that while this activity was rapidly falling behind schedule, primarily for reasons that AOC was not apprised, Clark's CPM schedule updates to AOC removed this activity from the critical path and reported that a significant amount of the work on this activity had been completed.

Mr. Heroy, in his reports to AOC regarding Clark's delay claims, noted this issue and concluded that Clark was "manipulating" the CPM updates by no longer showing that the activity of preparing and submitting the Palm House shop drawing was on the critical path. Resp. Exh. 52 at 3-5; A4 Supp. R00853, R00854.

Clark's as-planned, baseline CPM, dated January 31, 1999, indicated that Standard Iron's activity of preparing and submitting the Palm House aluminum structure shop drawings, which was scheduled for 6 weeks between February 1 through March 12, was on the critical path. Another activity, which was to be performed by Rough Brothers (the preparation of extrusions, drawings, dies and samples, which was scheduled to be performed from February 1 through March 22), was also shown to be the critical path during that period.<sup>80</sup> Resp. Exh. 53.

In Clark's monthly February 28 update, both of these activities were still shown on a parallel critical path, but the preparation and submittal of the Palm House aluminum structure shop

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<sup>80</sup> Mr. Heroy explained that this Rough Brothers' critical path activity was considered "constrained" and could not be allowed to float because it had to be completed by March 22, even though Rough Brothers' activities that followed this activity were not on the critical path and showed 28 work days of float. H.Tr., Heroy, 23:95-96. In contrast, the Standard Iron critical path activity of preparing the Palm House drawings tied directly into related activities on the critical path, AOC's approval of the Palm House drawings, to be followed by Standard's Iron's fabrication and delivery of the Palm House aluminum structure and the various activities involving the erection of the Palm House aluminum structure. The critical path then moved to Clark's installation of the scaffolding and Rough Brothers' installation of the monitor roof aluminum. Resp. Exh. 53.

drawings activity was shown to be 5 work days behind schedule and 50-percent complete.<sup>81</sup> Resp. Exh. No. 54. A reasonable interpretation of this update, in the absence of other notice of delays, was that work on the preparation on the Palm House shop drawings was progressing and was 50-percent complete.

In the March 31 CPM update, Standard Iron's activity for the preparation and submittal of Palm House shop drawings and the fabrication of the Palm House aluminum structure were taken off the critical path, even though the parties now agree this activity was in fact always on the as-built critical path, and the progress of the shop drawing preparation activity was still shown as 50-percent complete, but this activity was now scheduled to be completed by April 20. Resp. Exh. 55. The major reason that the Standard Iron Palm House activities were no longer shown to be a critical path item was that the duration of Standard Iron's work activity of fabricating and delivering the Palm House aluminum structure had been shortened, without explanation, from 69 work days, as shown on Clark's January 31 baseline schedule to 42 work days.<sup>82</sup> *Id.*; H.Tr., Heroy, 23:114. Neither Clark nor AOC has pointed to any contemporaneous documentation in the record reflecting the basis for this significant shortening of the duration of this activity. As pointed out by Mr. Heroy in one of his reports, this activity included the procurement of the aluminum for the Palm House, which Standard Iron stated would it take 6 to 8 weeks (*i.e.*, most of the 42 work day period).<sup>83</sup> Resp. Exh. 52 at 4.

In the April and May CPM updates, according to Mr. Heroy, the shop drawing preparation activity was reported as being 90-percent complete, Resp. Exh. 52 at 4, notwithstanding Clark's current position that AOC had significantly inhibited the progress of this activity during this time frame. In addition, the Palm House aluminum structure fabrication and delivery activity remained off of the critical path in all of Clark's CPM updates through August 1999, A4 Supp. R00854 at 8, although all parties now agree that it was in fact the as-built critical path.

In the October 31 CPM schedule update, the Palm House aluminum structure fabrication and delivery activity was still not shown on the critical path and was shown as 90-percent complete, although the actual fabrication of the aluminum had only begun on October 8, and the update indicated that this activity would finish on December 6.

The activities that replaced Standard Iron's work on the critical path in these updates were Rough Brothers' glazing activities for Palm House.<sup>84</sup> As noted above, at the time of the CPM

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<sup>81</sup> The Rough Brothers' critical path item was shown to have 20 days "negative float," that is, 20 work days behind schedule, and to be 0 percent complete. Resp. Exh. 54.

<sup>82</sup> According to Mr. Heroy, Clark's subsequent CPM updates up to August 1999 continued to shorten the duration of the fabrication activity to 41 work days and then further to 31 work days. A4 Supp. R00854 at 8.

<sup>83</sup> This is consistent with Mr. Kern's testimony that the procurement of the aluminum was always contemplated as part of this activity. H.Tr., Kern, 21:156-57.

<sup>84</sup> Those activities included preparation of the extrusions, drawings, dies and samples; submission of mockup; submission of Palm House glazing system design; AOC's approval of the Palm House glazing system design; and the fabrication and delivery of the Palm House conservatory glazing system. The

updates in question here, while Rough Brothers was carefully documenting and submitting RFIs for the problems that it was encountering in its work that it asserted delayed its progress, Standard Iron was submitting many less notices in this regard and was not reasonably apprising AOC of the problems that were inhibiting its work on this activity, even though its work, as the record now demonstrates, was in fact still the critical path and was rapidly falling behind schedule.

While we are not aware of Clark's motivation here, we note that Clark's initial request for a contract extension for asserted government-caused delay was submitted on May 13, 1999, and cited the well-reported issues that were assertedly delaying Rough Brothers' work that was then shown on the critical path. In contrast, Clark's subsequent requests for time extensions, commencing on January 10, 2000 (when it was apparent that the critical path was the fabrication and erection of the aluminum structure), cited design deficiencies relating to Standard Iron's critical path work.

As indicated above, Mr. Heroy concluded that Clark manipulated the critical path without explaining the logic changes to take the now admitted critical path activities of preparing and submitting the shop drawings and the fabrication and delivery of the Palm House structural aluminum off of the reported critical path, and that this caused "the whole focus [to be] shifted away from the submission of the structural steel/aluminum shop drawings." H.Tr., Heroy, 23:81, 119-21; Resp. Exh. 53; A4 Supp. R00853 at 8-9.

In response to Mr. Heroy's report attached to the contracting officer's decision on Clark's request for equitable adjustment, which again explained his conclusion that Clark had manipulated the critical path, COD, app. B., Mr. Kern indicated that the changes in the CPM updates were appropriate to reflect activity changes resulting from design issues. Complaint, app. 2, at 4. However, this report (and Mr. Kern's testimony at the hearing) do not explain why it was appropriate to shorten the period for the fabrication and delivery of the Palm House aluminum structure activity from 69 days to 42 days or to report significant progress on activities that were in fact significantly delayed.

At the hearing, Mr. Sullivan testified regarding the reasons for these CPM updates. He stated that Rough Brothers was having a lot of concerns about the progress of its work, in that the preparation of the shop drawings was going to take longer than anticipated, so adjustments in the duration of its activities was appropriate. H.Tr., Sullivan, 13:44. With regard to Standard Iron's activities, Mr. Sullivan testified that after its shop drawings were approved the initial plan was to fabricate the entire Palm House aluminum structure before it was sent to the job, but in early 1999, Clark and Standard Iron determined to start shipping those materials and putting them in place (to begin erection of the Palm House) almost simultaneously. *Id.* at 13:44-45. "In other words, let's say if he had three months to fabricate then he could start installing one month later with what had been fabricated in that first month. So the way that was reflected in the schedule was his fabrication duration was reduced." *Id.* at 13:45.

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predicted critical path on the revised CPM schedule then goes back to the original as planned Rough Brothers critical path activity of installing the monitor roof aluminum. Resp. Exh. 53

Mr. Sullivan did not testify, however, that he or anyone at Clark provided the foregoing explanation to AOC contemporaneously, or even prior to this litigation. Furthermore, Clark has provided no documentation to support this testimony.<sup>85</sup> To the contrary, the portions of the relevant CPM updates to the approved schedule provided to AOC that are in the record indicate that the fabrication and delivery of the Palm House aluminum structure activity stopped at the "early finish" date when the next activity, the installation of the Palm House structural aluminum activity, began. Resp. Exh. 55. However, if Clark intended to portray in the CPM update a new plan to phase the fabrication and installation of the Palm House aluminum structure, as described by Mr. Sullivan, we would expect this to be portrayed as the fabrication activity overlapping the erection activity for some period of time.<sup>86</sup> In this regard, we note that other CPM schedule documentation in the record graphically shows the continuance of CPM work activities past the date they have moved off the critical path. See, e.g., App. Exh. 92 at 3. Also, lacking from Mr. Sullivan's testimony is any explanation as to why it was appropriate to shorten the period for the fabrication and delivery of the Palm House aluminum structure activity from 69 days to 42 days or to report significant progress on activities that were in fact significantly behind schedule.

In any case, Clark did not, as was contemplated by the contract, provide the narrative explanation or the reasons for this major logic change, which resulted in a significantly different critical path. R4, K0101. As noted by Clark, it is true that Clark's January 31, 1999 baseline schedule was not approved until April 22, 1999, C4 Supp. 21 0940, so it could be argued that Clark did not violate the contract by not specifically reporting the logic changes that changed the critical path in its March 31 submission (although we note that Standard Iron Palm House activities remained off the critical path in Clark's schedule updates after April 22 up to August 1999). It is also true that a closer study by AOC of the updates would have disclosed Clark's changes in logic on its CPM updates and the record does not indicate that AOC initiated inquiries to determine the reasons for these changes reflected in the CPM updates. We also recognize that the Palm House glazing activities, many of which initially had only 28 work days of float, may well have become near critical path activities. However, none of these factors change the apparently misleading and possibly manipulative nature of the updates showing that the Standard Iron's Palm House critical path activities were no longer on the critical path (even though they were in fact still the critical path activities), and indicating that significant progress had been made in Standard Iron's preparation of the shop drawings and fabrication activities (notwithstanding the evidence now extant showing that these activities were well behind schedule). Apart from specific contract

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<sup>85</sup> AOC's approval of Clark's as-planned baseline schedule included the comment, "Need to establish procedures on updating Fab/Del activities." C4 Supp. 21 0940. In response, Clark stated, "[Clark] will indicate progress on Fab/Del [fabrication and delivery of the Palm House aluminum structure] and Submittal activities on all future update pencil copies. If necessary, we can then determine jointly appropriate updates for specific Fab/Del and Submittal activities." App. Exh. 112 at 1. Clark apparently expects us to make the inference from these documents that Clark explained its rationale for changing the critical path, but has offered no testimony and has pointed to no other evidence in the record that supports that inference.

<sup>86</sup> We note that, as events unfolded, Clark/Standard Iron actually did employ this phased fabrication and erection of the Palm House structural aluminum, that is, erection of the Palm House aluminum structure commenced while fabrication activities continued.

provisions, contracting parties must exhibit good faith in the performance of a contract; good faith performance by a contractor does not include subterfuges and evasions. See Cibinic & Nash, *Administration of Government Contracts*, at 4-5.

### **3. Sub-Period 1B.**

#### **AOC's Approval of Palm House Aluminum Structure Shop Drawings July 12 through August 23, 1999.**

AOC's review of the Palm House aluminum structure shop drawings was the as-planned and as-built critical path activity that immediately followed the preparation and submission of the Palm House aluminum structure shop drawings critical path activity. Clark's as-planned CPM schedule allowed only 25 calendar days for AOC's approval, beginning March 15 and ending April 9, 1999. Resp. Exh. 53. There is no dispute that this 25-day duration was inconsistent with the contract, which provided that AOC would have up to 30 calendar days to approve such submittals, including shop drawings. R4, K0091.

A drawing package, including monitor trusses and lattice girders, was submitted to AOC for review on June 8. R4, SI0004-12. AOC completed its review of this package on July 12 and returned the package to Clark with the notation that they were to be revised and resubmitted, with various review comments on matters that needed to be addressed or corrected. R4, SI0001-12. Another drawing package, consisting of 14 shop drawings for the Palm House girders and trusses, was submitted to AOC for approval on July 12. R4, SI0013-35.

While these packages did not include all of the Palm House structural aluminum shop drawings, the parties agree that the July 12 submittal to AOC moved the as-built critical path to the next activity--AOC's review of the drawings. It logically follows that the parties concede that these packages apparently contained sufficient drawings to allow for the commencement of fabrication when the drawings were approved by AOC. The July 12 package was returned by AOC to Clark on August 23 with a cover sheet stating that the package was "approved as noted, resubmission required," with various review comments on matters that needed to be reviewed or corrected.<sup>87</sup> R4, SI0013-35.

Mr. Kern states that there was a 10 calendar day delay beyond the required 30 calendar day approval period, H.Tr., Kern, 21:65; App. Exh. 92, at 7-8, and Mr. Heroy states there was a 10-work day delay. Resp. Exh. 62. We calculate the delay here as 12 calendar days.<sup>88</sup> Given that Mr. Heroy concedes that, based on his review, this delay in AOC's review of the drawings may have delayed the next critical path activity--procurement, fabrication and delivery of the Palm House aluminum structure--by 10 work days, COD, app. B, at 15, we find that AOC is responsible for a 12 calendar day delay because of its late review of the shop drawings.

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<sup>87</sup> The legends on the individual 14 drawings in this package included "reviewed no exceptions," "reviewed, exceptions noted, resubmission not required," "reviewed, exceptions noted, resubmission required," and "rejected, resubmission required." Under the contract, fabrication was not authorized if the architect-engineer required resubmission of the drawing. R4, K0095.

<sup>88</sup> 30 days from July 12 is August 11. The August 23 approval was 12 calendar days later than August 11.

#### **4. Sub-Period 1C.**

##### **Procure, Fabricate and Deliver Palm House Aluminum Structure Activity up to Start of Fabrication-August 24 through October 8, 1999**

The record shows that the primary activity taking place during this subperiod was the procurement of the structural aluminum and coordination between Standard Iron, Rough Brothers and Clark of the Palm House structural aluminum and steel drawings and Rough's proposed glazing system. H.Tr., Kern, 21:65-66. As discussed above, this coordination activity was specifically required by the contract. R4, K0079, K0910. This subperiod ended when Clark elected to commence fabrication on October 8, even though the shop drawings had not been approved. H.Tr., Torchio, 15:265-66.

In its post-hearing brief, Clark apparently claims delay in this subperiod based upon various asserted design problems discovered during the coordination between Rough Brothers and Standard Iron, as detailed in notes in a meeting held with AOC and DMJM on September 21, 1999.<sup>89</sup> App. PFF ¶ 291; *see* C4 Supp. 21 2341-45. However, Mr. Kern's analysis shows no delay occurred during this subperiod. In fact, his analysis found that the activities during first two subperiods were delayed by 132 days and that Clark mitigated this delay by 2 days during this third subperiod to allow fabrication to begin on October 8 with only 130 days of delay. App. Exh. 92 at 7. Using the windows analysis, 130 days is the total delay during Period 1. Thus, we find no delay during this subperiod.

#### **5. Period 1 Conclusion**

Based on our analysis of this period, we find that the contract was delayed by 130 calendar days, and that Clark was responsible for 114 days of this delay and that AOC was responsible for 16 days of this delay. As indicated above, Clark was responsible for 118 days of the delay and AOC was responsible for 4 days of the delay during Sub-Period 1A, and AOC was responsible for 12 days of delay in Sub-Period 1B. This totals 134 days of delay (118 + 4 + 12). However, actual fabrication of the Palm House aluminum structure began on October 8, which was only 130 days later than the as-planned date of May 31, 1999 for the start of fabrication. App. Exh. 92 at 7. Thus, Clark's decision to start fabrication on October 8, even though the shop drawings had not been approved, had the effect of mitigating its 118 days of delay by 4 calendar days. This reduced Clark's responsibility to 114 days of the 130-day total delay for this period, with AOC being charged with responsibility for the remaining 16 days of delay.<sup>90</sup>

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<sup>89</sup> As detailed below, the alleged design defects discussed in the September 21 meeting are relevant in considering the delay in Periods 2 and 3 of this windows analysis, involving the fabrication of the Palm House aluminum structure and the erection of the Palm House aluminum structure activities.

<sup>90</sup> This methodology is consistent with the methodology employed by Mr. Kern in his CPM windows analysis of this period. App. Exh. 92 at 7.

## B. Period 2.

### October 8, 1999 (Start of the Palm House Structural Aluminum Fabrication Activity) to April 19, 2000 (Start of the Palm House Structural Aluminum Erection Activity)--Total 144 Day Delay

#### 1. Summary of Period 2

Under Clark's as-planned schedule, the fabrication and delivery of the Palm House structural aluminum and structural steel activity<sup>91</sup> was to begin April 12 and be completed on July 19, 1999, a period of 98 calendar days. Resp. Exh. 53. Mr. Kern testified that this activity always included the procurement of the aluminum, and that, under its planned schedule, Standard Iron would first procure the structural aluminum, actual fabrication would begin on May 31, and the fabrication would be completed by July 19. App. Exh. 92 at 3; H.Tr., Kern, 21:155-58. This means the actual fabrication of the structural aluminum and steel was planned to be completed within a period of 49 calendar days.

The record shows that structural aluminum was procured in July or August of 1999.<sup>92</sup> H.Tr., Torchio, 15:262. Even though Clark's shop drawings for the structural aluminum had not yet been approved, they apparently were sufficient to proceed with fabrication and Clark chose to begin fabrication of the structural aluminum on October 8 as a reasonable mitigation of its delay.<sup>93</sup> H.Tr., Torchio, 15:262, 265-66; Kern, 21:74. Under Mr. Kern's and our windows CPM analysis of this period, October 8 is the start of the second windows period.

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<sup>91</sup> In view of the nature of the issues in this appeal, our discussion here focuses on the structural aluminum fabrication.

<sup>92</sup> Although the parties have pointed to nothing in the record to establish when the aluminum for this activity was procured, it appears that Standard Iron did so, perhaps to mitigate the delay in accomplishing its work, in July or August of 1999 prior to the beginning of this windows period, even though it had not been authorized to procure aluminum because the shop drawings had not been approved. H.Tr., Torchio, 15:262; see A4 Supp. R00756 (one Standard Iron employee assigned the task of preparing a "Revised Alum[inum] Mat[eria]l List" by July 19 and another employee the task of "Shop & Buy Alum[inum] Mat[eria]l by July 23); see also H.Tr., Kern, 21:167 (from his review of the records, he recalls the aluminum for the contract being procured sometime in July 1999). Moreover, the parties have not directed the Board to anything in the record showing when the aluminum was delivered to Standard Iron's facility in Chattanooga, Tennessee, in order for fabrication to begin on October 8, 1999.

<sup>93</sup> AOC suggests that Clark could have begun fabrication even earlier than October 8, although Clark's shop drawings for the monitor and Palm House trusses had not yet been approved by AOC. The Board finds that although Clark, as a reasonable mitigation, decided to begin fabrication prior to the approval of its shop drawings, this did not require Clark to commence fabrication any earlier than Clark chose to do so. Where, as here, the contract provides that the contractor is to await approval of its shop drawings by the government before commencing fabrication, a contractor is not required to proceed at its own risk without such approval. See *T.C. Bateson Constr. Co.*, ASBCA No. 4718, Aug. 28, 1958, 58-2 BCA ¶ 1896 at 7,693. That the contractor decided to assume the risk of proceeding prior to receiving approval of its shop drawings does not require the contractor to accept any greater risk by proceeding even earlier.

The Palm House aluminum structure was fabricated at Standard Iron's facilities in Chattanooga, Tennessee. H.Tr., Sullivan, 13:12, 44, 184. The first items to be fabricated were apparently the monitor and the Palm House arch trusses. A4 Supp. R00690. There is little documentation in the record showing the progress of fabrication of the structural aluminum structure during this period.

The monitor and arch truss structural aluminum was shipped to the job site in Washington, D.C. on April 18, 2000, and the erection of the Palm House aluminum structure commenced the next day. See H.Tr., Torchio, 15:272; see also H.Tr., Kern, 21:33 ("April 18<sup>th</sup> is [the date that] the major components were received on the site, not all of the components, but the major components were received on site to permit the erector who is Williams Brothers to begin erection on April 19, 2000. So my period two goes from October 8<sup>th</sup> to April 19<sup>th</sup>."') According to the parties, although Palm House structural aluminum and steel fabrication activities continued until September 1, 2000, the as-built critical path moved to the erection of the Palm House aluminum and steel structure activity on April 19, 2000. App. Exh. 92 at 3; Resp. Exh. 62.

According to the as-planned, baseline CPM schedule, erection was scheduled to begin on July 20, 1999. Resp. Exh. 53. Using the CPM windows analysis, the total delay for this period is 144 calendar days.<sup>94</sup>

## 2. Clark's Contentions and AOC's Response

Clark contends that the following six design problems, for which it asserts AOC/DMJM was responsible, were the reason for the 144-day delay in Clark's progress in the fabrication of the Palm House aluminum structure during this period: (1) the location of the level 3 and 4 catwalks in the Palm House, (2) the Palm House/Garden Court expansion joint, (3) the curved member tie-in at the lean-to at the south-end of the Palm House, (4) design of the East and West Transition houses, (5) design of the vestibules, and (6) design of the crickets. All of these issues (as well other issues) were discussed in a September 21, 1999 meeting attended by Clark, AOC, DMJM, Standard Iron, and Rough Brothers; at that meeting DMJM promised to respond to each of the six issues.<sup>95</sup> See C4 Supp. 21 2343-45; H.Tr., Kern, 21:72-74. As discussed below, the

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<sup>94</sup> Erection of the structural aluminum began 274 calendar days later than planned (April 19, 2000 rather than the planned July 20, 1999), but the project had already been delayed 130 days when this windows period began. The total delay for this period can be calculated by subtracting the earlier delay of 130 days from the late start of the erection delay of 274 days to arrive at a 144-day delay for this period.

<sup>95</sup> Although the September 21 meeting minutes refer to another alleged design error where an elevator shaft framing protruded through the lean-to glass line and Clark's post-hearing brief notes that this delayed detailing the shop drawings for the structural aluminum and glazing, see App, PFF ¶¶ 105, 106, 291, there is no evidence referenced by Clark that indicates that this design error caused delay that extended the fabrication activity in Period 2. H.Tr., Torchio, 15:251 (not remember when issue resolved in 1999). Clark also does not assert that the additional BOCA purlins, an issue that was also discussed at that meeting and which were ultimately provided by Rough Brothers (this is the subject of a constructive change claim No. 810028 (discussed below)), delayed Standard Iron's fabrication activities during this period; in fact, at the hearing in this matter, Clark's counsel, in objecting to cross-examination of its scheduling expert, Mr. Kern, admitted that "[t]here's absolutely nothing on this record that suggests that

record shows that these issues were not promptly resolved, but were only finally resolved between January and September 2000.

AOC responds that Clark has not met its burden of showing that these design issues delayed the critical path portion of the fabrication of the aluminum structure activity. In this regard, AOC notes that the first items of the aluminum structure that were fabricated and then erected were the monitor and the Palm House arch trusses, and argues that Clark has not shown how any of the foregoing design issues delayed the fabrication of these items or delayed the beginning of the next critical path activity--the erection of the Palm House aluminum structure. *See* COD, ch. 3, at 6-7; app. B at 14-15; H.Tr., Heroy, 16:63-65, 67-68, 170-71.

Although Clark did not argue that obtaining the bolt-hole locations on the splice plates at the top of the Palm House steel columns (a problem that was discussed above with regard to Period 1 where it caused no delay) caused delay in Period 2, this problem was actually resolved during period 2, so the Board has reviewed the record to determine whether it caused delay here. Our discussion in this section addresses the following asserted or possible causes for delay: (1) Palm House Level 3 and 4 catwalk design issues, (2) other Palm House structural aluminum design issues, (3) Palm House column splice plate holes issue, (4) other possible reasons for delay during this period, and (5) assertedly unrealistic duration for fabrication of the Palm House aluminum structure activity.

### **3. Palm House Level 3 and 4 Catwalks**

Clark contends that AOC's late revisions to the elevations of the Palm House level 3 and 4 catwalks caused delay during this period.<sup>96</sup> The level 3 and 4 catwalks are at the top of the Palm House and hang from the monitor trusses. *See* H.Tr., Sullivan, 12:263; Resp. Exh. 21A, Drawing A5031. Clark argues that although this matter was raised as an issue at the September 21, 1999 meeting, AOC only provided revisions to the elevations of these Palm House catwalks on December 7, 1999 and January 11, 2000, and that these late revisions required the revision of shop drawings and delayed the fabrication of structural aluminum during this period. *See* H.Tr., Sullivan, 12:263-64; Miranda, 17:129-33; App. Exhs. 76, 77.

The record shows that, at the September 21, 1999 meeting, the elevation of the level 4 catwalk and the need to move the catwalk level 3 to 4 stairs "to truss with motors" were discussed, and it

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there was any time impact related to the BOCA purlins." H.Tr., Kern, 21:140. Other design issues, such as the rolling ladders, that affected Rough Brothers' work and that were discussed at this meeting, were not specifically asserted to have caused delay to Standard Iron's fabrication activities during Period 2.

<sup>96</sup> The catwalks were made of structural steel and were also fabricated by Standard Iron. Although the fabrication of the catwalks was included within the fabrication and delivery of structural aluminum and structural steel activity, they apparently were not fabricated while this activity was on the critical path, given that they were not installed until August 2000, *see* C4 Supp. 01 01101 (first reference in Clark's Superintendent's Daily Reports to the installation of catwalks in the Palm House was on August 10), even though, as discussed below, all issues concerning these catwalks had been resolved by January 2000.

was reported that DMJM had stated that it would "review best location & coordinate."<sup>97</sup> C4 Supp. 21 2344. On October 7, 1999, Rough Brothers wrote Clark regarding its coordination of the structural issues with Standard Iron, and noted that the "following list of unresolved issues have been identified through RFIs, coordination efforts and meetings" that relate to the glazing system:

1. Palm House level 4 catwalk (rack arm interference with guardrails and physical clearance for maintenance purposes).
2. Palm House Stair from level 3 to level 4 catwalk. Stairs are located at the vent motors. Contract Documents show vent motors and mid bay. Vent motors must move to truss, thus stairs also must move to truss. (Reference Rough Brothers structural shop drawing comments #1 & #2 and Rough/Standard Iron meeting minutes #6 of Rough Brothers agenda items).

C4 Supp. 15 0224-25. Rough Brothers' list of "structural glazing issues" was forwarded to AOC on October 11.<sup>98</sup> C4 Supp. 21 2500-02.

On October 26, DMJM transmitted to AOC its responses to Rough Brothers' list of unresolved structural glazing issues. With respect to the Palm House catwalks, DMJM stated:

We agree that the vent motors should be mounted adjacent to a truss and the stairs with them. We suggest that both stairs be moved to the south side of the truss just north of center of the Palm House. The free area of the vents should not be reduced. We recommend reducing the width of the ladder to accommodate the operation of the ventilation sash.

C4 Supp. 21 2573-76.

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<sup>97</sup> The record shows that earlier, in an August 12 "Structural/Glazing system Coordination Meeting" between Clark, Standard Iron, and Rough Brothers, Rough Brothers expressed coordination concerns regarding the catwalk drawings, noting possible coordination issues between the catwalk handrails and vent rack arms (a glazing system component). See A4 Supp. R00703. Also, in an August 23 e-mail message to AOC, Mr. Witt noted that Rough Brothers had started its check for "interferences/coordination" with respect to "Vents/Catwalks/Structure," and that:

[a]s I noted before the vent motors will have to be mounted at a truss. This will require that the catwalks move from their location as shown on the Structural and Architectural drawings toward the truss, in opposite directions or in the same direction depending on whether the rolling ladders are capable of passing one another, to allow motor maintenance.

C4 Supp. 21 2058.

<sup>98</sup> Clark's October 11 letter to AOC actually refers to Rough Brothers' listing of unresolved structural glazing issues as having a date of October 8. This is incorrect. This list is actually derived from Rough Brothers' October 7 letter to Clark.

On November 9, following a November 4 "Glazing System Issues Meeting" between AOC and Clark (with Rough Brothers and Standard Iron also in attendance), Standard Iron wrote Clark to complain that the Palm House level 3 and 4 catwalks would remain on hold "[p]ending revised stair locations." C4 Supp. 21 2779-80. This letter was transmitted to AOC by Clark on November 9. C4 Supp. 21 2781. On November 21, Clark informed AOC that, with reference to Standard Iron's November 9 letter, "Standard Iron has placed certain elements of the Palm House and transition houses on hold until finalization of the design by the AOC."<sup>99</sup> C4 Supp. 21 2830.

In response, on December 7, 1999, AOC forwarded to Clark sketches RD-S53 and RD-S54, dated November 22, "which clarify the elevation of the [Palm House level 3 and 4] maintenance catwalk and the locations of the access stairs to the catwalk." C4 Supp. 21 3032-34. Clark forwarded AOC's letter and attached sketches to Standard Iron on that same date. C4 Supp. 21 3029.

On December 8, Rough Brothers advised Clark that it had concerns with DMJM's catwalk and access stairs sketches, and stated that it might be best to locate the stairs approximately 18 inches off of the truss centerline and that the stair design shown in DMJM's drawing would inhibit the placement of the shade support channels (part of the glazing system). Rough Brothers also commented that "[i]t also appears that the stair was actually raised approximately 12 inches while level 4 catwalk was lowered 11 1/2". This still does not allow for much room to get under the truss to move from one part of the catwalk to the next (approx. 18")." C4 Supp. 21 3070. Clark forwarded this letter to AOC on December 9, 1999. C4 Supp. 21 3069.

On December 15, Clark wrote AOC, stating that it had not yet received AOC's response to Rough Brothers' December 8 letter. Clark stated that "[u]nless notified otherwise, we are proceeding with the detailing of the catwalks based on" the sketches provided by AOC on December 7. Clark also noted that if the sketches were revised, "the detailing of these areas will once again be placed on hold."<sup>100</sup> C4 Supp. 21 3102.

On December 16, in an internal e-mail, DMJM noted that:

The level 4 catwalk elevation should be 84'-9 1/2". It should have been lowered 1'-11 1/2". The elevation of the level 3 catwalk was not changed.

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<sup>99</sup> Standard Iron's November 9 letter to Clark also identified three other design items (the Palm House/Garden Court expansion area, curved member at the Palm House lean-to, and East and West Transition Houses) as being on hold pending design information from AOC. Given that there is no reference to the monitor or Palm House trusses, we find from the record that the reference to "certain elements" being on hold in Clark's November 21 letter to AOC as referring to the level 3 and 4 catwalks and these other three design items.

<sup>100</sup> Again, we find this letter apparently only referenced the catwalks themselves. This letter does not indicate that this issue affected the monitor or arch trusses.

The sketches issued were to indicate structural members; location of the stairs from level 3 to level 4 should be coordinated between Standard and Rough Brothers based on the meeting and agreements made.

C4 Supp. 21 3128. The substance of this e-mail was forwarded to AOC on December 17, 1999. C4 Supp. 21 3156.

On January 3, 2000, DMJM forwarded to AOC revised sketches for the Palm House level 3 and 4 catwalks. C4 Supp. 22 0010-12. AOC forwarded these sketches to Clark on January 11, 2000. C4 Supp. 22 0244. This finally resolved the issue concerning catwalk elevations.

As discussed below, on May 30, 2001, AOC unilaterally issued Change Order No. 195, finding Clark entitled to payment of \$3,240 for the revisions in the Palm House level 3 and 4 catwalk elevations.<sup>101</sup> R4, COF 4920.

The record shows that design changes were made by AOC and DMJM to the Palm House level 3 and 4 catwalks during Standard Iron's fabrication of the structural aluminum while that activity was on the critical path. However, the Board finds that the design changes made by AOC were not made because the original design drawings for the level 3 and 4 Palm House catwalks were defective. Indeed, Clark has not argued, or directed the Board to any evidence showing, that the original catwalk design drawings were defective.<sup>102</sup> Instead, as explained below, the Board finds that the changes made in the level 3 and 4 catwalks were made to accommodate Rough Brothers' glazing support system design.

As discussed above, under the contract, while AOC retained design responsibility for the structural aluminum and steel, it was Clark's responsibility, pursuant to section 13123 of the contract, to design and provide a glazing system that includes motorized vents and the shade control system. *See* R4, K0897, K0907. Clark has not shown or argued that AOC's design specification specified the design or location of the vent motors, and the Board concludes that this was Clark's responsibility under the glazing system performance specification to determine the location of the vent motors.

Therefore, we find that the changes in the catwalk design were made to accommodate Rough Brothers in fulfilling the performance specification requirements. As indicated above, on August 23, Rough Brothers sought changes to the level 3 and 4 catwalk elevations because of where the catwalks would be in relation to where the vent motors would be located, and on October 7, 1999, Rough Brothers expressed concern that the Palm House level 3 catwalk, as

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<sup>101</sup> Clark's change claim was only for additional engineering time for making revisions to the shop drawings and includes no material or fabrication costs. We below find that Clark is entitled to further damages with regard to this Clark Change Order No. 810117.

<sup>102</sup> The Board recognizes that Mr. Torchio testified that the contract design drawings did not show the elevation of the catwalks and that this design omission affected fabrication. *See* H.Tr., Torchio, 15:249-50. This testimony is inconsistent, however, with Mr. Torchio's earlier testimony that recognized that the contract design drawings specified an elevation for the level 4 catwalks, *see* H.Tr., Torchio, 3:150, and, in any event, the contract drawings, in fact, show an elevation for these catwalks. R4, Drawing A304.

designed, would cause “rack arm interference with guardrails and physical clearance for maintenance purposes,” and that the stairs from level 3 and 4 would have to move because of the location of the vent motors. See C4 Supp. 21 2058; C4 Supp. 15 0224-225. All of these concerns were to accommodate Rough Brothers’ approach to satisfying its performance specification requirements.

In response to Rough Brother’s concerns, DMJM and AOC, on December 7, 1999, clarified the catwalk design in the contract drawings with respect to the elevations of the Palm House level 3 and 4 catwalks and the locations of the catwalk access stairs. C4 Supp. 21 3032-34. On the very next day, Rough Brothers expressed concern to Clark regarding DMJM’s design clarifications and that the revised design would still conflict with Rough Brothers’ glazing system design. C4 Supp. 21 3070. In response to Rough Brothers’ continued concern with respect to interference between the catwalks and its glazing system, AOC again revised the design, which was forwarded to Clark on January 11, 2000. C4 Supp. 22 0244.

In sum, AOC’s late revision of the catwalk design was done only because Clark requested the revisions to accommodate its performance of the glazing system performance specification. Clark has not argued, nor provided any evidence, that the glazing system performance specification could not be performed while complying with the original catwalk design.

Nevertheless, even though the catwalk change did not involve the correction of a defective design, delay damages for extended performance can still be recovered if the catwalk change itself caused delay, see *Pathman Constr. Co. v. United States*, 227 Ct. Cl. 670, 673-74; 652 F.2d 70 (1981), or if the delay in issuing the catwalk change caused an “unreasonable delay” in the contract, but only if the delays are shown to have been proximately caused by the government’s actions. *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199. While delay damages associated with ordered changes are compensable under the Changes clause if it is shown that the change caused compensable delay on the project, *Pathman Constr. Co. v. United States*, 227 Ct. Cl. at 673; *G.M. Shupe, Inc. v. United States*, 5 Cl. Ct. at 699, delay damages associated with a delay in issuing a change are only compensable under the Suspension of Work clause and may not be compensated under the Changes clause. See *U.A. Anderson Constr. Co.*, ASBCA No. 48087, April 27, 1999, 99-1 BCA ¶ 30,347 at 150,083; *Timmons, Butt and Head, Inc.*, ASBCA No. 15948, December 27, 1971, 72-1 BCA ¶ 9247 at 42,881; *Weldfab, Inc.*, IBCA No. 268, August 11, 1961, 61-2 BCA ¶ 3121 at 16,209-10; see also *W.M. Schlosser, Inc. v. United States*, 50 Fed. Cl. 147, 152 (2001)

Under the contract’s Suspension of Work clause, Clark is only entitled to delay associated with revisions to the catwalk design to the extent that there was an “unreasonable delay” caused by the late issued catwalk design revisions by AOC. R4, K0049-50. Since the Suspension of Work clause does not define what is a reasonable or unreasonable period of delay, the courts have stated that whether a particular delay is reasonable or not is entirely dependent upon the circumstances of the particular case. *Tri-Cor, Inc. v. United States*, 198 Ct. Cl. 187, 458 F.2d 112 (1972); *CEMS, Inc. v. United States*, 59 Fed. Cl. 168, 230 (2003) (5 month delay not unreasonable delay); *Commercial Contractors, Inc. v. United States*, 29 Fed. Cl. 654, 661-66 (1993).

The resolution of this catwalk design issue required considerable give and take over a 4-month period between Rough Brothers, Clark, AOC and DMJM in order for DMJM to address Clark's/Rough Brothers' performance specification design issues. Nevertheless, based on our review of the record, we think that the DMJM and AOC were ultimately dilatory in providing the revised catwalk design on December 7, 1999, almost a month after November 9, when Clark advised AOC that fabrication activities involving the catwalks would be put "on hold" pending an answer.

However, as indicated above, in order to be compensated for delay, the contractor has the burden of showing the delay of work on the critical path was proximately caused by the government's actions. *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 197; *Fru-Con Constr. Corp. v. United States*, 43 Fed. Cl. 306, 336 (1999); *G&H Machinery Co. v. United States*, 16 Cl. Ct. at 570-71. We find that Clark has not shown that these late revised catwalk drawings caused any delay, much less unreasonable delay, in completing the critical path Palm House aluminum fabrication work activities performed during this period, such that the commencement of the next critical path activity--the erection of the Palm House aluminum structure--was delayed.

In support of its claim that these late issued catwalk revisions caused delay in this period, Clark argues in its post-hearing brief that the monitor trusses could not be "finalized without determining the locations at which the catwalks would attach" and that the catwalk revisions "delayed the detailing and fabrication of the entire Palm House Monitor." See App. PFF ¶¶ 108, 109, 111, 112. In support of these contentions, Clark cites the testimony of Mr. Sullivan, where, in response to his counsel's examination as to the affect of the catwalk design revisions, Mr. Sullivan testified:

[w]ell, those catwalks hang from the trusses that are part of the monitor and if you change the elevation you change the angle at which the support is. If you change the angle which the support is you change the detailing of where the holes are to bolt up the support that holds up the catwalk.

H.Tr., Sullivan, 12:263. This testimony from Mr. Sullivan indicates that the design revisions would require detailing changes, and suggests that these detailing changes would have to be made on the monitor and/or arch truss shop drawings. Clark also cites the testimony of Mr. Miranda of A&N, who testified that the revisions in the catwalk design required A&N to revise its shop drawings, although he did not testify that this required the monitor or arch truss shop drawings to be revised. H.Tr., Miranda, 17:130-33. Clark also cites to the testimony of Mr. Torchio, on behalf of Standard Iron, who testified that the catwalk revisions "obviously affected the catwalks and it also affected the detailing of the total monitor systems and part of the Palm House structure." H.Tr., Torchio, 15:249-50.

However, this testimony does not satisfy Clark's burden to show that the critical path portion of the fabrication of structural aluminum activity was delayed. In this regard, the record does not show that the catwalk revisions delayed the fabrication of the monitor trusses or any other part of the Palm House structure that was delivered to the job site on April 18, 2000 (when the Palm House aluminum structure fabrication activity moved off of the critical path), and no other

evidence has been identified that shows any such delay.<sup>103</sup> Specifically, Clark cites us to no specific testimony or evidence identifying the particular monitor trusses or related shop drawings that it asserts were affected by the catwalk revisions or showing when the work affected by the revisions was to be, and actually was, performed.<sup>104</sup> Although Clark asserts that the monitor and the Palm House trusses could not be “finalized” until it received the catwalk revisions, Clark does not explain what remained to be “finalized” or how this delayed its fabrication of the monitor or Palm House trusses, and ultimately the delivery of the monitor and Palm House trusses to the job site.

Although it appears that the fabrication and installation of the catwalks themselves may have been affected by the late revisions, Clark simply has not shown that this impacted Clark’s critical path fabrication work during this period. The record evidences that the catwalks were not fabricated until the time that the erection of the Palm House aluminum structure was on the critical path (in Period 3) and were not installed until August 2000, and we note that under Clark’s as-planned and as-built CPM schedules, the level 3 and 4 catwalks were to be installed after the erection of the monitor and other Palm House trusses. Resp, Exh. 53; H.Tr., Sullivan, 12:184.

In sum, the Board finds that the conclusory statements offered by Clark, which are unsupported by evidence having any independent guarantee of reliability (such as specific testimony or documentary evidence), are insufficient to satisfy Clark’s burden of establishing that AOC’s catwalk design revisions caused delay to Clark’s work in this period. See *Fru-Con Constr. Corp. v. United States*, 43 Fed. Cl. at 336-37; *G&H Machinery Co. v. United States*, 16 Cl. Ct. at 574. “General statements that disruption or impact occurred ‘absent any showing though the use of updated CPM schedules, logs or credible and specific data or testimony will not suffice to meet the [Appellant’s] burden.’” *Dawson Constr. Co., Inc., supra*, at 130,314, citing *Preston-Brady Co., Inc.*, VABCA Nos. 1892 *et al.*, March 3, 1987, 87-1 BCA ¶ 19,649 at 99,520.

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<sup>103</sup> In its post-hearing brief, Clark also cited to testimony of Mr. Miranda for the proposition that the catwalk revisions delayed the preparation of the monitor truss shop drawings. App. PFF ¶ 109, citing, H.Tr., Miranda, 17:104-08. Mr. Miranda did not specifically testify, however, that the catwalk revisions delayed the fabrication of the monitor trusses. Moreover, this particular testimony concerned a note Mr. Miranda prepared on July 29, 1999 (well before the catwalk issues discussed here), and referred to problems with all of the catwalks, in connection with the geometry problems affecting the layout of the Palm House structure (the geometry problems discussed above in Period 1). See C4 Supp. 21 1794. In response to Respondent’s cross-examination, Mr. Miranda admitted that the problems involving the survey in 1999 were not related to AOC’s late revisions of the level 3 and 4 catwalks at issue here. See H.Tr., Miranda, 17:212.

<sup>104</sup> In contrast, with respect to other claimed design deficiencies, Clark generally directed the Board to specific design and shop drawings in the record, and elicited testimony with respect to the import of those drawings.

#### 4. Other Structural Design Issues

Clark also argues that fabrication and delivery of structural aluminum was delayed during this period by the five other structural design issues identified at the September 21, 1999 meeting, that is, the issues, associated with (1) the Palm House/Garden Court expansion joint, (2) the curved member at the lean-to at the south end of the Palm House, (3) the East and West Transition houses, (4) the vestibules, and (5) the crickets. C4 Supp. 21 2343-45. The record shows that all of these design issues were resolved some months after the September 21 meeting, although not all involved defective specifications as alleged by Clark. We find that, with regard to some of the promised designs, AOC/DMJM was dilatory in providing the revised designs to address these issues, but, as discussed below, here too Clark has failed to show that the resolution of these issues caused any delay during this period.

Specifically, the Palm House/Garden Court expansion joint design issue did not involve a design defect (as alleged by Clark) and was resolved on August 4, 2000 (well after the fabrication of the Palm House aluminum structure activity moved off of the critical path), when AOC issued design sketches reflecting Rough Brothers' and Standard Iron's design.<sup>105</sup> C4 Supp. 22 2877. The design issue associated with the curved member at the Palm House lean-to appears to have been a design defect and was resolved on January 31, 2000, when AOC issued revised drawings.<sup>106</sup> C4 Supp. 22 0467-70. The design issue associated with the East and West Transition Houses also appears to have been a design defect, which was not resolved until January 20, 2000, when AOC forwarded drawings to Clark.<sup>107</sup> C4 Supp. 22 0347. The design issue associated with the cricket areas involved a design defect that was resolved by April of 2000 (shortly before the commencement the next critical path activity--the erection of the Palm House aluminum structure), when DMJM designed a truss extension, called "CC extended," to support the cricket areas.<sup>108</sup> See A4 Supp. R00827; H.Tr., Sullivan, 12:252. The design issues

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<sup>105</sup> The Palm House and Garden Court were designed to stand alone, and an expansion joint had to be provided at the interface of these two structures. The design drawings did not show where or how the expansion joint was to be attached. In our consideration below of Clark Change Order No. 810238 requesting an equitable adjustment for providing this element, we found that Clark, not AOC, was responsible.

<sup>106</sup> There are two lean-tos, which are glass structures, extending out from the sides of the Palm House. AOC's design drawings for the lean-to at the south end of the Palm House, where the lean-to joined the vestibules, did not show a curved structural member needed to support or "finish off" the purlins in that area. H.Tr., Miranda, 17:113-15.

<sup>107</sup> The East and West Transition Houses are located at the outside corners of the East and West Garden, respectively, and do not attach to the Palm House trusses. See Resp. Exh. 21, Drawing S203; H.Tr., Sullivan, 4:129-30. This design issue was considered in Clark Change Order No. 810133 below, where we find that Clark is entitled to recover its claimed costs.

<sup>108</sup> A cricket "is basically a two-sided roof used to shift water" and attaches to the Palm House trusses. H.Tr., Sullivan, 12:250-51. The design drawing showed a member that did not attach to anything, "just out there in midair." *Id.* at 12:251. Ultimately, a truss extension (called "CC extended") was designed to support the cricket area, see C4 Supp. 22 0475-77 (clarification of dimensions for the CC Truss and CC Extended Truss), and further clarification was provided during the April 5 design issues meeting. A4 Supp. R00827 (dimensions and connections of CC extended were verified).

associated with the vestibules involved design defects, which were not all resolved until April of 2000.<sup>109</sup> A4 Supp. R00827; H.Tr., Sullivan, 12:255-56.

Clark's essential argument here is that "all of these design elements are an integrated part of the entire superstructure," and that "AOC's failure to design structural members, . . . such as the cricket areas, the lean-tos and vestibules" delayed Clark's performance of the contract. See C4 Supp. 08 00021.

AOC's position, which was stated in the contracting officer's decision on Clark's claim and in its subsequent filings, is that these other structural design deficiencies affected "minor/limited areas of the Palm House and apparently did not affect the Palm House monitor or the main arch trusses supporting the monitor," which were the first elements of the Palm House aluminum structure to be erected, and thus did not cause delay to the critical path of the project. See COD, ch. 2, at 13; ch. 3, at 8; attach. B at 14. In the report attached to the contracting officer's decision, Mr. Heroy noted:

Though contractor records detailing the progress of actual off-site fabrication activities are not available, the project records that are currently available indicate that fabrication of structural elements in the main body of the Palm House (main arch trusses and monitor) proceeded independently while the delay issues claimed by Clark were still under discussion.

COD, attach. B, at 15; see also H.Tr., Heroy, 24:67-69.

Even though it had been apprised of the reasons why AOC believed that there was no delay during this period as a result of these design issues, Clark failed to provide evidence that shows how the fabrication of the monitor and the main arch trusses was delayed by the resolution of these design issues; explain why the fabrication of the structural elements, where these design issues were found, themselves affected the progress of critical path work in this period; or otherwise show that the critical path work was delayed during Period 2 by the resolution of these issues. As noted above, Clark bears the burden of establishing that these design issues delayed Clark's critical path work. See *Fru-Con Constr. Corp. v. United States*, 43 Fed. Cl. at 336; *G&H Machinery Co. v. United States*, 16 Cl. Ct. at 570-71.

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<sup>109</sup> AOC's design provided for two vestibules at the east and west corners at the south side of the Palm House to provide access to the outdoor garden from the Palm House. The initial problem with the vestibules was that the design drawings did not provide sufficient dimensions, such as elevations, spacing of beams, or the "actual ridge of the support frame." H.Tr., Miranda, 17:117-18. These design issues were apparently resolved on January 20, 2000, when AOC provided revised vestibule drawings to Clark. See C4 Supp. 22 0346. Subsequently, however, Rough Brothers complained that the new vestibule design provided for two different roof slopes on either side of the hip that would not allow the glazing system framing to work. See C4 Supp. 22 1152. The roof slope was changed to 30 degrees on each side in a design meeting at Rough Brothers on April 5, 2000. A4 Supp. R00827. Both of these design changes were the result of design defects. Nevertheless, we below deny Clark Change Order No. 810163 because Clark failed to reasonably establish its claimed damages.

Instead, Clark argues that Mr. Heroy's, and thus AOC's, position, is flawed because it fails to account for the fact that each of the foregoing Palm House aluminum structure elements, where the asserted design problems were found, were all part of the Palm House aluminum structure fabrication activity in Clark's CPM schedule and are not included in any other activity, even though they are necessary to complete the work. App, PFF ¶¶ 325-26. Clark contends that "Mr. Heroy inappropriately bifurcate[ed] the shop drawing, fabrication and erection processes to take these items out of the critical path activities . . . and yet he admits that he never add[ed] them back into the schedule." App. Reply Brief at 19, 25-26.

Clark's argument fails to account, however, for the fact that under its own expert's analysis the fabrication of the Palm House aluminum structure activity was no longer on the critical path once the erection of the structure commenced. It is true that both Mr. Heroy and Mr. Kern recognized that the fabrication of the foregoing so-called "peripheral" elements, where design problems had been found, were part of the fabrication of the Palm House structural aluminum activity. However, under the reasoning and analysis of Mr. Kern, although this fabrication activity continued after the commencement of the erection of the monitor and Palm House trusses, the fabrication activity was then no longer on the critical path. See H.Tr., Kern, 21:32-33; App. Exh. 92 at 2-3, 13. Mr. Kern also testified at the hearing in response to cross-examination as follows:

- Q. Now when you say that it [referring to a particular work activity] might constitute additional man-hours but not additional time, what distinction are you making between the two?
- A. Whether or not something is on the critical path at that time.
- Q. In other words, there could be additional time expended, but if the additional time is not on the critical path it would not lead to an increased duration of the project time, correct?
- A. That's correct.

H.Tr., Kern, 21:141-42.

Thus, consistent with Mr. Kern's testimony, AOC, while recognizing that the so-called "peripheral" structural aluminum elements were part of the structural aluminum fabrication activity, contends that the resolution of these issues were not shown by Clark to have caused delay in Period 2 as of the time that the critical path moved to the erection of the Palm House aluminum structure activity, and thus could not be found to have caused delay in the overall contract term. Clark does not argue that the actual completion of fabrication of these other elements was necessary before the erection activity could commence; to the contrary, the record shows that the erection activity commenced and continued while other structural aluminum elements were still the subject of shop drawing preparation and fabrication.

Accordingly, in determining the cause of delay during this period, the appropriate issue for consideration is not whether there were design problems that caused the delay in the fabrication

of any particular element of the Palm House aluminum structure if these elements did not delay this activity while it was the critical path. Rather, the appropriate issue for the Board's consideration is whether the resolution of the design problems associated with these so-called peripheral elements of the Palm House aluminum structure somehow delayed the fabrication and/or the erection of the monitor or arch trusses, which were the structural elements of the Palm House that were first erected when the fabrication of the Palm House aluminum structure moved off of the critical path and the Palm House structural aluminum erection activity became the critical path.<sup>110</sup> As discussed above, under a CPM analysis, only delays to activities on the critical path extend the contract term and these delays are only compensable if the contractor meets its burden of showing that they are proximately caused by the government. *Kinetic Builders Inc., v. Peters*, 226 F.3d at 1317.

Clark has sought to meet its burden of showing that there was delay in the fabrication of the structural aluminum activity caused by these design issues through the testimony of the Palm House shop drawing detailer (Mr. Miranda), Clark's project manager (Mr. Sullivan) and Clark's scheduling expert (Mr. Kern). These individuals' testimony and the other evidence referenced by Clark do not establish that the various design issues caused delay in the period. Rather, the Board finds that this testimony and other evidence merely presume that the design deficiencies delayed the progress of the work simply because the design deficiencies concerned areas that attached to or adjoined the Palm House aluminum structure.

Mr. Miranda testified that the designs were defective and affected the preparation of the Palm House shop drawings. H.Tr., Miranda, 17:112-123, 127, 129. In his testimony, Mr. Miranda explained in a general fashion the problems with the design drawings with respect to crickets, vestibules, the curved member at the lean-to, and the Palm House/Garden Court expansion joint, and plausibly explained that the preparation of shop drawings for these particular elements were therefore delayed. What is not obvious to the Board, or established by Mr. Miranda's testimony, is the impact of the design deficiencies on the fabrication of the Palm House aluminum structure elements during this period or on the start of erection of the monitor and arch trusses. In this regard, Mr. Miranda did not testify that the fabrication of the monitor or Palm House trusses could not proceed pending the resolution of the design deficiencies of the so-called peripheral elements, which attached or adjoined the monitor and arch trusses.

Mr. Sullivan testified that the crickets, vestibules, and the curved member at the lean-to, and the Palm House/Garden Court expansion joint all attach to the Palm House structure,<sup>111</sup> and therefore Clark needed "to have all the information to do all [its] shop drawings so [Clark] can coordinate all the structural components [Clark was] going to detail and fabricate." H.Tr., Sullivan, 12:250-62. The essence of Mr. Sullivan's testimony is that because the crickets,

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<sup>110</sup> For the same reason, the Board does not find probative Mr. Torchio's testimony that the fabrication was delayed because various design issues involving the aluminum structure were not resolved when the erection of the structure commenced on April 17, so that various aluminum structure elements had to be fabricated after that date. See H.Tr., Torchio, 15:272-73. This testimony is not relevant in determining whether there was delay during the period when the fabrication activity was still on the critical path.

<sup>111</sup> Unlike the vestibules, crickets, and curved member at the lean-to, the East and West Transition Houses do not attach to the Palm House trusses.

vestibules, Palm House/Garden Court expansion joints, and the curved member at the lean-to attach to the Palm House structure, the monitor and the Palm House structure could not be fabricated without knowing the “designer’s intent.” *Id.* at 12:253.

The Board does not find that Mr. Sullivan’s opinion as to the impact of the design deficiencies on Standard Iron’s fabrication of the monitor and Palm House trusses satisfied Clark’s burden of establishing that these design deficiencies delayed Clark in this period. In providing this testimony, Mr. Sullivan did not establish that his lay opinion as to the impact of the delays on Standard Iron was based upon any personal knowledge or experience, nor does Mr. Sullivan provide supporting detail for his opinions.<sup>112</sup> Nor has Clark provided any other probative evidence that supports Mr. Sullivan’s opinion.

Also, at least with respect to the crickets, vestibules, and Palm House/Garden Court expansion joint, these alleged deficiencies were not resolved until either near the end of this windows period or in the next period after erection of the monitor and arch trusses had begun. Given the late resolution of these elements, it is not obvious to the Board, nor has Clark shown, that the defective design of the crickets, vestibules, and Palm House/Garden Court expansion joint delayed the fabrication of the monitor and Palm House trusses during the time that the Palm House aluminum structure fabrication activity was on the critical path. In this regard, the record shows that as early as February 17, 2000, the monitor had been fabricated and assembled by Standard Iron in its facility in Chattanooga, Tennessee, and that at that time a number of the Palm House arch trusses had also been fabricated. *See* A4 Supp. R00715. The record also shows that Randy Kissel of TGB, a consultant employed by Clark to assist Standard, reported that the “fabrication of the Palm House was nearly complete” by April 6, 2000.<sup>113</sup> *See* A4 Supp. R00719. Also, Mr. Torchio of Standard Iron testified that the Palm House arch trusses and the monitor trusses were being fabricated concurrently in Standard Iron’s facility. H.Tr., Torchio, 16:83. Thus, the Board finds, from these contemporaneous records and evidence, that fabrication of the monitor and Palm House arch trusses was accomplished without resolution of these alleged design deficiencies.

Clark also cites the testimony and report of its scheduling expert, Mr. Kern, in support of its argument that these design deficiencies delayed Clark’s performance during this period. Mr. Kern testified that all 144 calendar days of delay in this period of Clark’s critical path schedule for the fabrication of structural aluminum were caused by the design deficiencies

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<sup>112</sup> Mr. Sullivan was not qualified as an expert in the fabrication of structural aluminum. The Board recognizes that the parties agreed that Mr. Sullivan could offer opinion testimony relating to construction but not engineering. In this regard, Mr. Sullivan was not offered as an expert witness in these matters. H.Tr., Sullivan, 1:15-16. Lay opinion may be accepted under Federal Rule of Evidence (FRE) 701(c), where lay opinion testimony is shown to be based upon sufficient experience or specialized knowledge, but not based upon scientific, technical or other specialized knowledge within the scope of expert testimony subject to FRE 702. *See Medforms, Inc. v. Healthcare Management Solutions, Inc.*, 290 F.3d 98, 110-11 (2<sup>nd</sup> Cir. 2002).

<sup>113</sup> Mr. Kissell was a consultant (a professional engineer experienced in aluminum fabrication) who was recommended by Rough Brothers and hired by Clark to assist Standard Iron. *See* H.Tr., Sullivan, 4:134, 138; 13:144-45.

identified by Clark for the catwalks, vestibules, crickets, Palm House/Garden Court expansion joint, and East and West Transition Houses. *See* H.Tr., Kern, 21:74-80; App. Exh. 92; App. Exh. 94. Mr. Kern also suggested in his testimony that it was not until April 5, 2000, at which time Clark received design information with respect to the various design allegations identified above, that Clark could complete fabrication of the Palm House aluminum structure to the extent that erection of the monitor could begin on April 19, 2000. H.Tr., Kern, 21:79-80. This testimony is consistent with his report with regard to this period, wherein he stated:

Although parts of the Palm House fabrication were completed earlier, field installation could not start until all of the design issues, including those associated with the structures adjoining the Palm House were resolved. These adjoining structures connected to the main Palm House structure, and the effect of the solutions to adjoining structure design problems on the main Palm House was unknown.

App. Exh. 92 at 15.

This statement in Mr. Kern's report reflects an opinion for which Mr. Kern was not qualified as an expert. That is, Mr. Kern was presented and qualified as an expert in construction management and scheduling. *See* H.Tr., Kern, 21:21-22. This statement reflects an opinion regarding engineering judgment with respect to structural aluminum, for which Mr. Kern was not qualified as an expert witness.<sup>114</sup> Apart from the fact that Mr. Kern was not presented or qualified as an expert in the engineering or fabrication of structural aluminum, Clark also did not demonstrate that Mr. Kern's opinion was based upon facts sufficient to support such an opinion, or present other evidence that independently supported his opinion.<sup>115</sup>

For example, Mr. Kern's view that field installation could not commence until all of the design issues were resolved is not supported by any statement in the April 5 meeting minutes, which documents a meeting shortly before erection of the Palm House aluminum structure commenced where many of these design issues were discussed. A4 Supp. R00823. In fact, on April 1 (just prior to the April 5 meeting), Clark advised Standard Iron that, because the information awaiting resolution "covers a very small portion of the overall Palm House Structure," it saw no reason that the installation of the major elements of the Palm House structure could not commence by

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<sup>114</sup> We note that Clark attacks the opinion of Mr. Heroy that these design deficiencies were peripheral to the main Palm House structure, and therefore did not delay the fabrication, delivery, and start of erection of the monitor and Palm House trusses, on the basis that Mr. Heroy was not qualified as an expert in the fabrication of structural aluminum. App. Reply Brief at 15-16. We agree that Mr. Heroy, as is the case with Clark's scheduling expert (Mr. Kern), was not qualified as an expert in structural engineering or the fabrication of structural aluminum, and we do not credit either expert's engineering opinion concerning the fabrication of structural aluminum. The Board also notes, however, that it is Clark that bears the burden of demonstrating that these design deficiencies affected the structural aluminum elements that were needed to begin erection, and that Clark has not satisfied this burden.

<sup>115</sup> The Board notes that a number of witnesses were qualified as experts in structural engineering during the hearing on this matter, including two offered by Clark, but no expert was examined with respect to, or offered, the opinion proffered by Mr. Kern in his report.

April 18 as it had earlier ordered Standard Iron, even though the design issues on which Clark bases its delay claim for this period were not resolved.<sup>116</sup> A4 Supp. R00358.

Also, in response to cross-examination by Respondent's counsel at the hearing, Mr. Kern demonstrated a lack of knowledge as to what comprised Standard Iron's as-planned or as-built schedule for fabrication of the structural aluminum. H.Tr., Kern, 21:166-68. Although Mr. Kern stated that he was aware from Mr. Torchio's testimony at the hearing that Standard Iron estimated 4,200 hours for the fabrication of the structural aluminum, Mr. Kern was apparently not aware of Standard Iron's estimate when he prepared his March 22, 2002 report, and at the hearing, he testified that he was unaware of how the estimated hours were distributed among the various structural aluminum components. *Id.* at 21:153. In response to cross-examination with respect to analyzing the items that were alleged to be delaying fabrication of the monitor, Mr. Kern admitted that "there wasn't enough visibility through the documents into what was being done at any given time in the Standard Iron shop to do that." *Id.* at 21:174; *see id.* at 21:212-13 ("I didn't have details to allow me to determine what Standard Iron was doing in the shop on a day-by-day basis.")

Mr. Kern's lack of knowledge as to exactly what was the plan for fabrication of specific structural aluminum elements, what was being fabricated when, and how long fabrication for specific structural aluminum elements took is not surprising, given the lack of information provided in the record regarding Standard Iron's fabrication of structural aluminum. Clark has not cited (nor has the Board otherwise found) any evidence or testimony that provides any detail to determine when structural aluminum components were fabricated, how much time was planned for fabrication for such components, how much time was actually spent in fabrication, or how the fabrication was affected by the resolution of the alleged design defects.<sup>117</sup>

In this regard, the Board has reviewed the trial testimony of Mr. Torchio (who actually is employed by Standard Iron's parent corporation) and Chester Dobbs (a former Standard Iron employee who had at various times had done blueprint detailing, drafting, estimating and project management for Standard Iron). H.Tr., Torchio, 15:201-02; Dobbs, 17:239-40. The Board has also reviewed the depositions, as designated by the parties, of several other Standard Iron employees and former employees. *See* D.Tr. of Mr. Dobbs, James Bass (former president of Standard Iron), Jerry Frederick (Standard Iron's project manager), and Denman Elder, Sr. (Standard Iron's project manager for the Botanic Garden fabrication work). None of these trial witnesses or deponents provided any detailed testimony showing when particular structural aluminum components were to be fabricated or were actually fabricated, or how long fabrication of particular components took. In fact, the deposition testimony presented in the record is singularly distinguished by the deponents' lack of specific recall as to the fabrication of the structural aluminum for this project.

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<sup>116</sup> AOC points out that this contemporaneous Clark position is consistent with AOC's position that the asserted design problems did not affect the fabrication of the monitor and arch trusses. Resp. Reply Brief, part 1, at 23-24.

<sup>117</sup> We find this total lack of contemporaneous documentation regarding the production of the structural aluminum surprising in a manufacturing facility, particularly with regard to a major project on which claims based on asserted defective designs were contemplated.

Looking specifically at Mr. Elder's designated deposition testimony, Mr. Elder had little recall of the structural aluminum fabrication, even though he was the individual in charge of the production of the structural aluminum. For example, Mr. Elder could not recall which elements of the structural aluminum were planned to be fabricated first and also could not recall which items were actually fabricated first. *See* D.Tr., Elder, 16, 19-20. In this respect, Mr. Elder testified that he did not remember whether or not fabrication of the monitor components commenced before that of the Palm House arch trusses.<sup>118</sup> *Id.* at 21-22.

When examined regarding the existence of documentary evidence of the fabrication of structural aluminum, Mr. Elder testified that during this project he kept a production log for structural aluminum and steel components that provided individual item numbers, descriptions, and as-planned shop hours, and as work progressed, Mr. Elder would input shop hours expended and delivery dates. *Id.* at 34-36. Mr. Elder testified that this production log was kept on the hard drive of his computer and that he did not retain a paper or hard copy of this record. *Id.* at 55, 70-71. Mr. Elder also testified that within the 2 weeks prior to his deposition by AOC's counsel on September 4, 2003, Mr. Elder deleted this record from his computer's hard drive at the direction of Standard Iron's current president.<sup>119</sup> *Id.* at 71. Although this information was requested by AOC during discovery prior to the date that this information was destroyed, it was not provided to AOC.<sup>120</sup> Moreover, notwithstanding that Mr. Elder was Standard Iron's production manager for this project, Mr. Elder testified that no one ever asked him for the production log.<sup>121</sup> *Id.* at 36.

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<sup>118</sup> Despite his lack of recall about the details about the fabrication process, Mr. Elder did testify, "we worked around different problems and stuff. Had we had all of the drawings approved and all of the questions answered before we ever started it, it would have made life a whole lot easier than it did." D.Tr., Elder, 76. Mr. Elder was also of the view that it was irrelevant as to what piece of structural aluminum was fabricated when, so long as all of the structural aluminum was ready to be fabricated by the shipping date. *Id.* at 78.

<sup>119</sup> One month of this production log was retained on a floppy disk. *See* A4 Supp. R00997.

<sup>120</sup> At least 2 weeks before the production log was deleted from Mr. Elder's computer, AOC's counsel stated to Clark's counsel by letter dated August 5, 2003 that:

in our review of Standard Iron's documents, we could not locate any fabrication schedules or any other type of schedule showing the sequence of fabrication for the structural pieces. Our fabrication consultant advises us that such schedules should be in Standard Iron's files, possibly in Standard's shop files. Please advise whether Standard's shop files were produced. Also please inquire of Standard where such schedules were kept.

AOC's Counsel's Letter to Clark's Counsel, August 5, 2003, attached as Exhibit A to Clark's Opposition to Respondent's Motion *in Limine* to Exclude Appellants Evidence Relating to Fabrication by Standard Iron. AOC withdrew this Motion *in Limine* during the trial and the Board made no ruling with respect to this motion. H.Tr., 16:155.

<sup>121</sup> We recognize that this log, if retained, may not have allowed the fabrication process of the Palm House structural aluminum to be tracked. However, given that this documentation was destroyed during discovery, we are unwilling to draw any conclusions as to what it may or may not have shown.

In sum, the Board finds that Clark has failed to establish that the five alleged design deficiencies delayed the fabrication of the Palm House aluminum structure activity while it was on the critical path, so as to delay the commencement of the erection of the Palm House aluminum structure. Give the absence of supporting documentary evidence or credible testimony that shows that any or all of the foregoing design issues caused delay in the completion of this period, Clark's delay claim with regard to this period amounts to a "total time" delay claim, where Clark has stated a litany of design problems and expect us to presume that they were the reasons for the 144-day delay. As indicated above, this does not meet Clark's burden of demonstrating that the alleged delays were caused by the government. *Kinetic Builders Inc., v. Peters*, 226 F.3d at 1316; *L&A Jackson Enters. v. United States*, 38 Fed. Cl. at 37.

### 5. Palm House Column Splice Plate Holes

Neither Clark nor AOC has argued that identifying the location of the splice plate bolt-holes caused delay during this period. As discussed in detail above, the Palm House column splice plate holes did not cause delay during the preparation of Palm House aluminum structure shop drawings window period, where Clark asserted the delay, because of the approach A&N/Standard Iron/Clark took to resolving this issue. As explained above, to prevent delaying the detailing of its shop drawings for the Palm House trusses, Clark decided to detail the arch trusses without the bolt-holes and to drill these holes during fabrication of the trusses.

With regard to the resolution of this issue during Period 2, Mr. Torchio testified:

To progress the job we built the main bow truss columns without bolt holes on the end. We assembled the trusses with the lacings in them, left the ends of the trusses a foot long anticipating that once we did get the information that we would in the shop cut the columns to the proper length and then install or drill the holes for the connections.

H.Tr., Torchio, 15:229-30. The record shows that, after the lead abatement was completed and the old aluminum removed, templates were produced from the existing steel columns and splice plates to obtain the exact bolt-hole locations. *Id.* at 15:232. According to Clark's Superintendent's Daily Reports, the templates were apparently produced on March 30, 2000.<sup>122</sup> *See* C4 Supp. 01 01424. Using the templates as a guide, Standard Iron used a magnetic drill press or presses while the truss rested on the floor of its facility to drill holes in the appropriate locations at one end of each Palm House arch truss. H.Tr., Torchio, 15:233-36. Mr. Torchio testified that Standard Iron's original plan was to punch the holes in the trusses and that drilling the holes, as was actually done here, took 10 times longer than punching the holes would have taken. *Id.* at 15:230-31. In this respect, Mr. Torchio indicated that it took 20 man-hours per truss to drill the holes.<sup>123</sup> *Id.* at 15:231. If it took 20 man-hours to drill the holes, which was

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<sup>122</sup> Clark's Superintendent's Daily Report for March 30, 2000 actually states that the templates were started on this date. C4 Supp. 01 01424. However, none of the subsequent reports refer to punching templates for the Palm House trusses.

<sup>123</sup> Mr. Torchio appeared to testify at H.Tr., 15:231 that it took 20 man-hours to "punch" the trusses. However, Mr. Torchio's testimony was in response to a question that asked how long it "took" to punch

10 times longer than for Standard Iron's planned punching of the holes, and given that there are 20 trusses, then we calculate the total man-hour delay involved would be 360 man-hours.<sup>124</sup>

The Board finds that although AOC may have been responsible for some delay in the fabrication of the Palm House arch trusses due to the need to drill rather than punch the bolt-holes,<sup>125</sup> Clark has provided us with no reasonable means of estimating how many days of delay these 360 man-hours would entail. This is so because Clark presented no evidence showing how many workers or crews participated in drilling the holes or how many days this drilling required or how many days punching the holes would have required. *See* H.Tr., Torchio, 16:107. We have also been unable to use Standard Iron's 4,200 man-hour estimate for the fabrication of the structural aluminum to estimate the amount of delay, *see* A4 Supp. R000699; H.Tr., Dobbs, 17:248, 254, because Clark has established that this estimate does not just represent direct fabrication hours, but includes many other activities, such as unloading and moving structural aluminum material; that no presumptions can be made about the size and number of the production crews that may have been included in the estimate, which Mr. Dobbs testified varied during the fabrication of the structural aluminum; and that thus no reasonable assumptions can be made that correlate this estimate to the number of days Standard planned to take to complete this activity. *See* App. Reply Brief at 29; *see also* H.Tr., Dobbs, 17:248-57.

In sum, although the Board concludes that Clark's fabrication of the Palm House trusses may well have been delayed by the splice plate bolt-hole design issue, there is insufficient evidence to even estimate how much time this delayed the work during this period. As indicated above, in order to recover delay damages, the burden is on Clark to separate its delays from those chargeable the government, and absent a "clear apportionment" of the delay attributable to each party, the contractor cannot recover delay costs. *William F. Klingensmith, Inc. v. United States*, 731 F.2d at 809; *Mega Constr. Co., Inc. v. United States*, 25 Cl. Ct. at 745-46. We recognize that the standard for apportioning delay damages "is not so high" as to require "absolute exactness or mathematical precision," and that the forum "needs only enough evidence to make a fair and reasonable estimate." *Sipco Servs. & Marine, Inc. v. United States*, 41 Fed. Cl. 196, 226 (1998). Here, however, Clark has simply not met its burden of establishing how much delay was caused by this the resolution of this issue. *See Cavalier Clothes, Inc. v. United States*, 51 Fed. Cl. 399, 424 (2001) (delay damage claim denied where the contractor failed to distinguish between its own and the government's delays in part because it failed to retain

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the holes, to which he responded 20 man-hours. The Board finds that Mr. Torchio was testifying to how long it actually took to do this work, that is, to drill the holes. In this regard, Mr. Torchio could not have been testifying that it would take 20 man-hours to punch holes, as this would mean that it took 200 man-hours per truss (or 4,000 total man-hours for all 20 trusses) to perform the drilling. Clark in its post-hearing briefs has presented no argument concerning the amount of time it took to drill the bolt-holes.

<sup>124</sup> The Board calculated this total man-hour delay taking the product of 20 man-hours to drill each truss by the total number of trusses (20), and subtracting the original estimate to punch the holes (one-tenth of 20 hours, that is, 2 hours, per truss).

<sup>125</sup> It is interesting to contrast the specificity of the evidence presented regarding the nature and the degree of impact of the splice plate hole problem on the fabrication activity with the generalities regarding fabrication problems assertedly caused by the other alleged design defects.

relevant records); *Mega Constr. Co., Inc. v. United States*, 25 Cl. Ct. at 745-46, 748 (“poor quality of plaintiff’s delay claim precluded the court from apportioning the remaining days of delay”); *Weeks Dredging & Contracting, Inc. v. United States*, 13 Cl. Ct. 193, 241 (1987) (contractor failed to identify reasonable method to allocate delay).

## 6. Other Possible Reasons For Delay

There is also evidence in the record that delay in this period may have been the result of Standard Iron’s fabrication errors and coordination with Rough Brothers. Specifically, Mr. Heroy testified that based on his review of the documents of AOC, Clark, Standard Iron, and Rough Brothers, which were made available during discovery, he found that the time taken by Standard Iron for fabrication was affected by fabrication errors, shop catches (where the fabrication shop discovers a discrepancy on the shop drawings), and by changes caused by the coordination with Rough Brothers. H.Tr., Heroy, 24:60-65, 70-72.

On the other hand, Mr. Kern testified that he found nothing in the record that indicated that anything but the resolution of the design issues caused delay in the fabrication during this period. H.Tr., Kern, 21:209. Mr. Kern also testified that Rough Brothers’ reviews of the Palm House aluminum structure shop drawings, in particular the shop drawings for the monitor, did not themselves cause delays in the fabrication. *Id* at 21:170-73.

Clark asserts that we should not give weight to Mr. Heroy’s opinion because he was not qualified as an expert in aluminum shop fabrication or related activities. As noted above, we agree that Mr. Heroy, like Mr. Kern, was not qualified as an expert in structural aluminum fabrication.<sup>126</sup> However, Mr. Heroy is not here expressing an opinion on such matters, but rather is interpreting documents in the record as to how they may impact the project’s schedule. We give weight to Mr. Heroy’s opinion in this regard because it is within the scope of his expertise to review file documentation to ascertain causes for delay on a construction project and because his opinion is otherwise supported by the record.<sup>127</sup>

Specifically, AOC has directed the Board to, and we have also found, documentation in the record that suggests that Rough Brothers’ coordination comments may have impacted the progress of the fabrication work during this period. *See, e.g.*, A4 Supp. R00114, Meeting Minutes for August 12, 1999 Coordination Meeting (numerous coordination issues concerning glazing system and structural aluminum discussed; Rough Brothers has a “personal interest to

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<sup>126</sup> As indicated above, Mr. Heroy was accepted by the Board an expert in critical path analysis, investigation of engineering and construction schedules and investigation of delay claims. H.Tr., Heroy, 23:46-47.

<sup>127</sup> For example, Mr. Heroy does not have to be an expert on coordination of glass glazing systems and structural aluminum fabrication to review the file documentation of the fabrication activity, and provide an opinion on whether this evidenced that the issues contained therein may have caused delay to the fabrication activity. In contrast, as detailed above, we did not give weight to Mr. Kern’s opinion that forms the basis for his assignment of responsibility for all 144 days of delay to AOC because, unlike Mr. Heroy’s opinion, it stated an engineering judgment, and there was no expert testimony or other evidence that otherwise supported this opinion.

insure that the structure is detailed such that it will accept the glazing system without rework[;] Rough Brothers is doing a close check of the shop drawings including means and methods for fabrication and installation.”); A4 Supp. R00608, Rough Brothers Letter to Clark, September 27, 1999 (“As we continue by checking the revised [shop] drawings, we are finding that some items have been changed but there still remains a number of items that will cause problems either in fit up of components or require modifications prior to installation of the glazing system”); A4 Supp. R00059, Standard Iron Letter to A&N, February 1, 2000, (“look at attached comments from Rough Bros. regarding corrections to the aluminum truss drawings”); A4 Supp. R00808, Standard Iron Letter to Clark, February 3, 2000 (discussion of status of 21 ongoing coordination issues where Standard Iron was addressing Rough Brothers’ coordination comments).

Although, as noted, Mr. Kern testified that the coordination comments of Rough Brothers themselves did not delay Standard Iron’s fabrication in this period, he provided no reasons for this conclusion, and admitted that his review did not get into the details of the fabrication and shop drawing preparation process for this period. H.Tr., Kern, 21:170-74; 195-96, 212-13. In fact, Clark has argued that the requirements that Rough Brothers coordinate with Standard Iron and certify this coordination were unreasonable and onerous.<sup>128</sup> See H.Tr., Torchio, 15:254; Witt, 19:136, 280-81; App. PFF ¶ 289. This argument suggests that this coordination may well have affected the duration of the structural aluminum fabrication activity during this period.

Other documentation in the record suggest that shop catches may have delayed fabrication of the structural aluminum. See, e.g., A4 Supp. R00106, A&N E-mail to Standard Iron, November 15, 1999, (“Here are the two drawings revised per shop catch”); A4 Supp. R00061, TGB E-mail to Clark, February 21, 2000, (numerous dimensions shown on shop drawings that do not appear to match contract drawings); A4 Supp. R00062, Clark E-mail to TGB, February 21, 2000, (“[o]n the fabricated parts, it appears that the dimensional errors were corrected in the shop. The drawings will be revised to reflect this”).

AOC also references documentation prepared by Mr. Kissell that suggests fabrication errors may have delayed Standard Iron’s fabrication of the structural aluminum. See, e.g., A4 Supp. R00349, TGB Report on February 17, 2000 Meeting at Standard Iron, (Palm House trusses would need to be disassembled and action taken (including grinding) to provide for required clearance); A4 Supp. R00719, TGB Memorandum of April 6, 2000 Meeting at Standard Iron (in which a number of problems were documented including that the erection plan needs to be revised to show the correct number of purlins, that elements with water stains need to be cleaned or replaced (if not accepted by AOC), and that Palm House trusses still needed to be disassembled and actions taken to ensure correct clearance). Mr. Kern testified that he did not try to account for the time spent by Standard Iron in addressing Mr. Kissell’s recommendations. H.Tr., Kern, 21:196-97.

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<sup>128</sup> As we found above, the coordination efforts were required by the contract and the certification requirement did not materially affect Clark’s obligation to coordinate the work of its subcontractors.

Clark argues that AOC has not demonstrated that the asserted fabrication errors or shop catches existed or delayed Clark's work during this period. However, Clark has provided no evidence that explains TGB's reports or why these problems did not delay fabrication.<sup>129</sup>

As noted, Mr. Kern testified that he found nothing in the record that indicated that anything but the resolution of the design issues caused delay in the fabrication during this period. H.Tr., Kern, 21:209. However, Mr. Kern did not specifically address the documentation discussed above in the file that suggests that coordination or fabrication problems may have delayed fabrication. Instead, his testimony was primarily based on his review of the deposition testimony of Standard Iron personnel, and in particular upon that of Mr. Elder, who testified that Standard Iron had adequate resources to timely perform the fabrication. *Id.*; see D.Tr., Elder, 74, 78. As indicated above, the testimony of Standard Iron's witnesses and deponents were remarkably vague in the details concerning the fabrication process, and we find that Mr. Elder's stated confidence in Standard Iron's ability to timely complete the work was essentially conclusory in nature and was thus unconvincing.

As discussed above, the documentation and testimony regarding the fabrication process is sparse and conflicting. Thus, the Board is unable to determine with any degree of certainty whether the fabrication errors and coordination issues may have caused delay in the fabrication activity in this period. Nevertheless, the Board believes that there is sufficient evidence to establish the possibility that these issues may have had some impact on the length of the fabrication process that caused the start of the erection of the Palm House aluminum structure activity to be delayed.

#### **7. Unrealistic Duration for Activity**

Moreover, as suggested by AOC, *see* Resp. PFF, part 1, tab 4, at 34, we are not certain that the time allocated for the fabrication of the Palm House aluminum structure (98 calendar days for the activity including procurement of the aluminum and only 49 days for the actual fabrication) was reasonable. The actual fabrication of the aluminum structure took considerably longer than 49 calendar days (from October 8, 1999 through September 1, 2000), and as discussed above, the record contains little documentation concerning Standard Iron's fabrication. It appears to the Board that, in estimating the amount of time required for the fabrication of the Palm House structural aluminum, Standard Iron and Clark may have approached this work as a standard "build-to-print" job and did not account for the time required for coordination with the glazing system subcontractor to ensure that the aluminum structure and glazing system would work together. As noted above, it was Clark's obligation under the contract to coordinate the work of its various subcontractors. R4, K0040, K0079.

Clark contends that the amount of time estimated for fabrication was irrelevant and that in any case AOC has not shown that the length of the fabrication period was unreasonably short. App. PFF ¶ 271; App. Reply Brief at 33. In this regard, Clark directs the Board to Mr. Kern's opinion that because Clark's as-planned schedule was accepted by AOC, Clark, and Clark's subcontractors, it "seemed like a reasonable schedule." H.Tr., Kern, 21:15. However, as noted

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<sup>129</sup> The Board notes that Mr. Kissel attended a portion of the hearing, but was not called by Clark as a witness to address or explain these issues.

above, it is Clark's burden to establish the reasonableness of its as-planned schedule in order to recover delay damages based upon a delay beyond the planned period. See *Donohoe Constr. Co., supra*, at 148,813; *Sierra Blanca, Inc., supra*, at 120,081. This burden is not satisfied by Mr. Kern's general testimony that he accepted Clark's entire as-planned schedule as reasonable because it was approved by AOC and accepted by Clark's subcontractors.<sup>130</sup> In this regard, the approval of the critical path schedule by AOC does not in itself demonstrate that the as-planned schedule was reasonable and feasible. See *Hansel Phelps Constr. Co., supra*, at 150,796.

## **8. Period 2 Conclusion**

In sum, we find that the contract was delayed by 144 calendar days in this period, and that by the end of this period, the contract had been delayed by a total of 274 calendar days. Clark has not met its "heavy burden" of showing with "specific evidence" that that the delay in its fabrication activities on the critical path in this period were proximately caused by the government with no concurrent delay. See *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198-99; *L&A Jackson Enters. v. United States*, 38 Fed. Cl. at 37. Thus, we find that Clark responsible for all 144 days of this delay.

### **C. Period 3.**

**April 19, 2000 (Start of the Palm House Structural Aluminum Erection Activity) to September 25, 2000 (Start of the Glazing System Installation Activity)--Total 39 Day Delay**

#### **1. Summary of Period 3**

The next activities on Clark's as-planned and as-built critical path schedule were the erection of the Palm House structural aluminum and steel and the installation of the catwalks. These activities formed this next window period under Mr. Kern's and our CPM analysis.

The critical path activities on the as-planned, baseline schedule performed in this period were install structural aluminum/steel I, II, and III and install maintenance level/miscellaneous metals 4, 3 and 2 (the catwalks). Under Clark's as-planned schedule, this activity was to have begun July 20, 1999 and be completed on November 9, 1999, a period of 112 calendar days. These activities were to be followed by Clark's erection of scaffolding (to support the installation of the glazing system) from November 10 through November 16. This windows period ends with the commencement of the installation of the glazing system, which was scheduled to commence on November 17. Resp. Exh. 53.

According to both Mr. Kern and Mr. Heroy, the structural aluminum and steel and catwalk erection activities were also the as-built critical path until the beginning of the installation of the glazing system. The as-built critical path during this period began with the start of the erection of the structural aluminum on April 19, 2000 and continued until September 25, 2000, when the

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<sup>130</sup> Clark also did not satisfy this burden with Mr. Elder's conclusory comments at his deposition that Standard Iron could have performed the fabrication work within whatever period had been allocated. See D.Tr., Elder, 74, 78.

critical path moved to Rough Brothers' installation of the glazing system (the first activity of which was the installation of monitor roof aluminum), a period of 159 calendar days.<sup>131</sup> See App. Exh. 92 at 17; Resp. Exh. 62. By the end of this period, the contract had been delayed by a total of 313 calendar days. App. Exh. 92 at 17. Using the CPM windows analysis, this represents a 39-calendar day delay for this period.<sup>132</sup> App. Exh. 92 at 17.

The erection of the Palm House structural aluminum and steel structure and the catwalks was performed by Standard Iron's subcontractor, Williams Steel. The erection activity began on April 19, 2000, the day after the monitor and arch trusses were delivered on-site. The record shows that from April 24 through May 18, Clark was assembling the monitor and erecting the tower upon which the monitor would sit, and by May 24, Clark had set the monitor upon the tower and erected the Palm House arch trusses.<sup>133</sup> See C4 Supp. 01 01285, 01 1236. As detailed below, there was a delay in setting the monitor caused by AOC's direction to Clark to change the size of monitor bolt-holes from three-quarters-inch to seven-eighths-inch, and to drill some new holes, after the monitor had already been assembled.

Williams Steel set up a 170-ton crane for the Palm House erection on May 11. C4 Supp. 01 01272. After the monitor and arch trusses had been installed, Clark was erecting various structural aluminum elements in the Palm House, including various purlins and the horizontal trusses, until June 16. It appears that sometime thereafter the crane was demobilized and was removed from the site, and the progress of the Palm House structural aluminum and steel erection work then slowed until August. The crane was remobilized on site on August 5. C4 Supp. 01 01094. Williams Steel then began installation of the lean-to trusses on August 6. Williams Steel also installed the level 4 and level 3 catwalks/miscellaneous metals from August 3 through August 15, followed by the level 2 and level 1 catwalks/miscellaneous metals until September 22.

On September 6, Williams Steel advised that as of September 1, 2000 the erection of the Palm House had sufficiently progressed to allow Rough Brothers to begin installing the glazing system on the monitor, which was the first of the Rough Brothers critical path activities. See A4 Supp. R00959; H.Tr., Kern, 21:87. However, Rough Brothers discovered that the monitor was not sufficiently level to allow Rough Brothers to begin its glazing system installation activities;

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<sup>131</sup> Since the actual erection of the scaffolding started on the same day as Rough Brothers started the installation of the glazing system, see App. Exh. 92 at 17, it did not affect the windows analysis for this period, which extends from the beginning of the erection of the structural aluminum and ends with the beginning of the installation of the glass glazing system.

<sup>132</sup> Erection of the glazing system began 313 calendar days later than planned (September 25, 2000 rather than the planned November 17, 1999), but the project had already been delayed 274 calendar days when this window period began. The total delay for this period can be calculated by subtracting the 274 days of delay attributable to the previously analyzed periods from 313 days to arrive at a 39-day delay for this period. See also App. PFF ¶ 302.

<sup>133</sup> The monitor was assembled on the ground and then lifted by a crane to be placed upon the tower. The Palm House corner trusses were then lifted by crane and attached to the monitor to hold up the monitor. H.Tr., Sullivan, 12:184-86.

Rough Brother ultimately addressed this problem with gutter clips that it fabricated. A4 Supp. R00546; H.Tr., Kern, 21:88. Rough Brothers, however, was unable to commence its first glass glazing system activity, the installation of monitor roof aluminum, until September 25. App. Exh. 92 at 17.

## 2. Clark's Contentions

Clark argues that there were three causes of the 39 days of delay in this period. First, Clark argues that 8 days of delay were caused by AOC, when AOC directed Clark to change the size of monitor bolt-holes from three-quarters-inch to seven-eighths-inch and to drill some new holes in the monitor, after Clark had started assembling the monitor on-site. App. PFF ¶ 304. Clark next argues that an additional 16 days of delay were caused when Clark's erection subcontractor, Williams Steel, had to await fabrication of material for the Palm House/Garden Court expansion joint, crickets, vestibules, and the curved member at the Palm House lean-to, the fabrication of which, Clark argues, was delayed by AOC's late resolution of design deficiencies for these elements.<sup>134</sup> App. PFF ¶¶ 305-06. Finally, Clark asserts that AOC was responsible for the delay caused in resolving the problem with the monitor not being sufficiently level to allow Rough Brothers to begin installing its glazing system on September 6; Clark contends that AOC, not Clark, was responsible for coordinating the differences in tolerances between the structural aluminum and the glazing system, and therefore AOC was responsible for the 15 days of delay caused before this problem could be resolved and the installation of the glazing system could commence. App. PFF ¶ 307; App. Reply Brief at 34.

We will consider each of these contentions in turn. Given Clark's lack of specificity and failure to reference file documents in establishing its delay claim for this period, the Board has, in addition to reviewing the analysis of the parties' respective scheduling experts and the parties' arguments, combed through the evidence in the record, including, in particular, Clark's Superintendent's Daily Reports for this time period.<sup>135</sup> "Although the [Board's] analysis 'takes into account the experts' contrary opinions, . . . we give most weight to the other evidence in the record, and draw the logical conclusions flowing therefrom.'" *Morganti National, Inc. v. United States*, 49 Fed. Cl. at 134.

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<sup>134</sup> Clark did not specifically identify the design issues which it complains delayed erection in this period, but states in its post-hearing brief that the design issues delaying erection during this period were identified in an April 5, 2000 meeting, which include in relevant part discussions concerning the design of the vestibules, crickets, and the curved member at the lean-to. App. PFF ¶ 306; see A4 Supp. R00827. Clark's scheduling expert in his March 22 report not only references the April 5 meeting to identify the design deficiencies that caused delay in this period, but specifically identifies the Palm House/Garden Court expansion joint design issue as causing delay. App. Exh. 92 at 19. Thus, we consider these four design issues to be those that Clark asserts caused this delay.

<sup>135</sup> Neither Clark nor AOC nor their scheduling experts cite to the Superintendent's Daily Reports to support their analyses. Also, the Board's review of the Superintendent's Daily Reports has been hampered by the fact that these reports, which were provided by Clark as a supplement to the Rule 4 File, are not sequentially filed.

### 3. Monitor Bolt-Holes

The monitor bolt-hole issue was also the subject of Clark Change Order No. 810213. In our resolution below of this change claim, we discuss in detail the pertinent findings, which we summarize here.

As indicated above, the assembly of the monitor began on April 24, 2000, after delivery of the Palm House structural aluminum, C4 Supp. 01 01285, and continued through May 12, 2000.<sup>136</sup> C4 Supp. 01 01274. At the same time, beginning May 4, 2000, Standard Iron/Williams Steel was performing preparatory work for erecting the monitor, that is, assembling the tower upon which the monitor would rest until the main arch trusses were attached, C4 Supp. 01 01261, and setting up the crane for erection. C4 Supp. 01 01272. The Superintendent's Daily Reports indicate that the monitor was assembled and ready to be erected upon the tower by May 15, 2000. C4 Supp. 01 01244 ("Rig monitor for pick to set.")

AOC, on May 12, 2000, after reviewing Clark's pertinent shop drawings and after the monitor had been assembled, found that Clark had not provided the number of bolts required by the contract drawings and gave Clark the option of either providing the requisite number of bolts as determined by AOC or increasing the size of the bolts provided from three-quarters-inch to seven-eighths-inch. With AOC's approval, Clark decided to replace 102 of the bolts with the larger bolts, which required Clark to ream out the existing holes and use larger bolts, and to drill 8 additional holes for three-quarters-inch bolts, for a total of 110 bolts. R4, 8404. As explained below, we found that 60 of the 110 bolts were Clark's responsibility because it had installed bolts that were not in accordance with the contract, and that 50 of these bolt-holes and bolts were AOC's responsibility because they had been drilled in accordance with the contract design and AOC's direction regarding these holes constituted a change to the contract.

The record, and in particular Clark's Superintendent's Daily Reports, show that erection of the monitor was delayed 3 days because of the need to replace the already installed monitor bolts with larger bolts. On May 15 (the same date that the monitor was being rigged to be picked up and installed), the parties apparently determined how this issue would be resolved. C4 Supp. 01 01244 ("Clarified monitor bolt-holes required to complete monitor per Andy Savaugue [DMJM engineer] direction/mark-ups."). On May 16, Clark was ready to erect the monitor, but this issue prevented erection. See C4 Supp 01 01246. On the next day, May 17, Clark "ream[ed] and replace[d] several monitor bolts due to AOC changes and lack of direction on submitted drawings." C4 Supp. 01 01248, R4, 8428. On May 18, the "x-tra" bolt-hole work had been completed and Standard Iron was again preparing the "monitor for erection." C4 Supp. 01 01250; R4, 8428.

As noted, Clark has asserted that this problem resulted in 8 calendar days of delay. This is evidently based upon Mr. Kern's report, where he indicates that the work was delayed to resolve the bolt-hole issue between May 11 and May 18. App. Exh. 92 at 18; H.Tr., Kern, 21:84. However, our review of Clark's Superintendent's Daily Reports for May 11 and 12 indicate that

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<sup>136</sup> The Superintendent's Daily Reports during this time period indicates that there were days when no work on the monitor was performed

the crane and shoring tower for Palm House erection and monitor placement were still being installed, and that on May 15 the monitor was being rigged to be picked up. C4 Supp. 01 01272, 01 01274, 01 01244. These were all necessary tasks that had to be performed before the monitor could be installed, and the record does not show that the bolt-hole issue delayed these tasks. We have unable to locate the Superintendent's Daily Reports for May 13 and 14, which were a Saturday and Sunday, respectively, but other reports in this timeframe showed that Standard Iron did not customarily work on weekends. Thus, we find that Clark has not shown that the bolt-hole issue was holding up erection from May 11 through May 15.

As indicated, both AOC and Clark were responsible for some of the work associated with resolving the monitor bolt-hole issue and therefore we find that both contributed to the delay arising from the change in the monitor bolt-holes. To establish entitlement to monetary damages for delay, an Appellant must establish causation and that the Government-caused delay was not intertwined with other delays. Where, as here, both parties contribute to the delay (in other words, there is concurrent delay), "neither can recover damages, unless there is in the proof clear apportionment of the delay and the expense attributable to each party." See *T Brown Constructors, Inc. v. Pena*, 132 F.3d 724, 734 (Fed. Cir. 1997).

Here, as discussed below in resolving Clark's change request, the record establishes the means for apportioning the 3 days of delay for this issue, based upon our finding that Clark is entitled to an equitable adjustment for 50 of the 110 revised bolt-holes and was itself responsible for the other 60 bolt-holes. Applying this same ratio to the 3 days of delay associated with the resolution of the monitor bolt-hole issue, the Board finds that AOC is responsible for 1.4 days of delay and that 1.6 days of delay were Clark's responsibility.<sup>137</sup>

#### **4. Delays due to Late Fabrication of the Palm House/Garden Court Expansion Joint, Vestibules, Crickets and Curved Member at Lean-To**

Clark contends that the erection of the Palm House structural aluminum activity, which began before Standard Iron had completed all of the structural aluminum fabrication, was also delayed for 16 days because various structural elements could not be timely fabricated due to the late resolution of design defects by AOC. Specifically, Clark asserts that erection had to be suspended when Standard Iron's subcontractor, Williams Steel, ran out of structural aluminum material to erect and had to await delivery of structural aluminum for the vestibules, crickets, curved member at the lean-to, and the Palm House/Garden Court expansion joint. App. PFF ¶ 305; App. Exh. No. 92 at 19.

AOC responds that the reason Williams Steel ran out of steel was that Clark elected to accelerate the erection of the monitor and main arch trusses, even though Clark was not preparing the shop drawings for these Palm House structural elements and fabricating them in sufficient time to maintain Williams Steel's accelerated work. Resp. PFF, part 1, § 1.A.1 at 40-41.

Neither Clark nor Mr. Kern (nor AOC) identify with any specificity any of the key events during this period to establish that any delays were the result of any of the alleged design deficiencies,

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<sup>137</sup> 3 days x 50/110 = 1.4 days.

but instead repeat a litany of alleged design problems and assert that they must have caused delay. Thus, we have again reviewed Clark's Superintendent's Daily Reports to help understand the progress of the Palm House structural aluminum and steel and catwalk erection activities during this period.

As stated above, the record shows that by May 24 Clark had set the monitor upon the tower and erected the Palm House arch trusses. *See* C4 Supp. 01 01285, 01 01236. Thereafter, until June 16, the record shows that Clark was erecting various structural aluminum elements in the Palm House and monitor, including installing main roof purlins and horizontal trusses and Palm House "bolt up." *See, e.g.,* C4 Supp. 01 01238, 01 01214, 01 01203; *see also* H.Tr., Torchio, 16:26.

The record is unclear as to when Williams Steel ran out of structural material to erect and "demobilized," that is, when Williams Steel removed its crane from the site. H.Tr., Torchio, 16:26. It appears from Clark's Superintendent's Daily Reports that after June 16 and until August 3 (when the installation of the Palm House catwalks/miscellaneous metals activity began), no substantial Palm House structural aluminum and steel erection work was being done. *See, e.g.,* C4 Supp. 01 01193, 01 01148. Specifically, these records show that, during this 53 calendar day period, Standard Iron performed other tasks, including work identified as Palm House "bolt up," *see, e.g.,* C4 Supp. 01 01182; work in the South Addition and Orangerie; installation of the Garden Court catwalk; and various repairs identified as "truss repairs" and "column repairs" in the Palm House. *See, e.g.,* C4 Supp. 01 01175, 01 01179. Also during this 53-day period, Standard Iron began the erection of the West Transition House structural steel. *See* C4 Supp. 01 01164. Thus, it appears that the Palm House structural aluminum and steel erection was for the most part suspended between June 16 and August 3 (although this period is not so identified by Clark).

The record also shows that about the time of the return of the Williams Steel's crane on Saturday, August 5, 2000, Standard Iron/Williams Steel actively resumed the erection of the Palm House structural aluminum. C4 Supp. 01 01094. On August 7, Standard Iron/Williams Steel started the erection of the Palm House lean-to trusses, which task appears to have continued through August 9. C4 Supp. 01 01095, 01 01099; H.Tr., Torchio, 16:26.

Installation of the Palm House catwalks/miscellaneous materials began on August 3 and continued through September 22, 2000. C4 Supp. 01 01148, 01 00912. Under Clark's as-planned schedule, catwalk levels 3 and 4, and associated miscellaneous metals, would be installed before catwalk levels 1 and 2. *See* Resp. Exh. 53; *see also* H.Tr., Sullivan, 12:186-88. Here, the Superintendent's Daily Reports does not specifically identify the installation of the level 3 and 4 catwalks, but do specifically identify the installation of catwalk level 2 (beginning August 15, 2000, *see* C4 Supp. 01 01107) and catwalk level 1 (beginning September 18, 2000, *see* C4 Supp. 01 00904). The Board thus concludes that the catwalk installation referenced in the Superintendent's Daily Reports prior to August 15 concerns the installation of catwalk levels 3 and 4. *See, e.g.,* C4 Supp. 01 01101.

Erection of the crickets started on August 18, 2000 and continued through August 25, 2000. C4 Supp. 01 01113, 01 01123. Clark started the installation of the vestibules' structural

aluminum on September 6, 2000, and this installation continued through September 15, 2000. See C4 Supp. 01 01088, 01 01084. The curved member (referred to as "tube steel" in the Superintendent's Daily Reports) at the lean-to at the south end of the Palm House was installed between September 18 and 22, 2000. C4 Supp. 01 00904, 01 00912. Clark does not state when the Palm House/Garden Court expansion joint was erected; however, the Superintendent's Daily Reports for this period do not show that the expansion joint was installed prior to September 25.

The heart of Clark's delay claim for this issue is that, but for the asserted design deficiencies in the vestibules, crickets, curved members at the lean-to, and the Palm House/Garden Court expansion joints, Standard Iron would have timely fabricated material to be erected, such that Williams Steel would not have run out of material to erect and had to demobilize while it awaited more material, and that this activity would not have been delayed.

There are a number of problems with Clark's argument. First, even if we accept that there were design deficiencies associated with the vestibules, curved member at the lean-to, and the Palm House/Garden Court expansion joint that delayed the fabrication of these elements, Clark does not show that this late fabrication delayed the fabrication of the Palm House structural aluminum and catwalks activities, such that the start of the installation of the glazing system was delayed. This is so because the record shows that when Clark was prepared to start installation of the glazing system as of September 1, 2000, A4 Supp. R00959, as described above, the vestibules, curved member at the lean-to, and the Palm House/Garden Court expansion joint had not been erected. This effectively demonstrates that the fabrication of these elements was not the reason that the beginning of the glazing activity was delayed.<sup>138</sup>

Also, Mr. Sullivan testified that Clark's plan was to erect the monitor, then the main arch trusses, then the lean-to trusses and then the catwalks, beginning with catwalk levels 3 and 4. H.Tr., Sullivan, 12:183-86. Mr. Sullivan further testified that installation of the glazing system would be "triggered" by the installation of the catwalks, that is, that installation of the catwalks was the "last activity in the aluminum steel work" that needed to be done before beginning installation of the glazing system on the monitor. *Id.* at 12:186. Thus, under Clark's plan, it was critical in this period that Clark timely complete the fabrication and delivery of the lean-to trusses and catwalks to allow the installation of the glazing system to begin on the monitor. As described above, by June 16, after the monitor and main arch trusses and certain other structural aluminum elements had been erected, Clark ran out of structural material to erect, causing Standard Iron's subcontractor, Williams Steel, to demobilize its crane to await the fabrication of the lean-to

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<sup>138</sup> As Mr. Sullivan testified, Clark's plan was to completely install the Palm House aluminum and steel structure and the catwalks before Rough Brothers began the glazing activity for a variety of reasons. H.Tr., Sullivan, 12:186-89. Notwithstanding this plan, as discussed above, the fact is that Clark determined that Rough Brothers could begin the glazing system activity as of September 1, notwithstanding that various elements of the Palm House aluminum and steel structure, for example, the vestibules and curved members, had not been installed. A4 Supp. R00959. It thus follows that the fabrication of Palm House structural aluminum elements installed after September 1 did not hold up the Palm House structural aluminum activities, so as to delay the commencement of installation of the glazing system when those activities became the critical path of the project.

trusses, H.Tr., Torchio, 16:26,<sup>139</sup> and the record shows that installation of the lean-to trusses and catwalks did not begin until August 2000.

While this point is not argued by the parties, the record shows that the fabrication, and thus the erection of the lean-to trusses, which was to be done before the installation of the catwalks, was apparently delayed by the preparation of shop drawings for these trusses. The shop drawings for the lean-to trusses were originally submitted to AOC on July 12, 1999, and were not approved by AOC, which required resubmission of the drawings. DMJM's notes on these drawings indicate that they were not approved because they did not identify the location of holes to be drilled in the trusses (which DMJM stated would have "to be obtained from field measurement of existing condition") and that dimensions shown for the "CB" truss differed from that shown on the structural drawing. See R4, SI0031-32. Clark does not contend, and the record does not otherwise show, that the rejection of these drawings was inappropriate. The shop drawings for the lean-to trusses were not resubmitted by Clark until April 18, 2000,<sup>140</sup> see R4, SI0057-58, and these drawings were approved by AOC on May 2, 2000. See R4, SI0076-77; SI0055. Clark has not asserted that AOC is responsible for any delay relating to the submittal or approval of these revised shop drawings.<sup>141</sup> Although the record does not contain information concerning the fabrication of the lean-to trusses, it does show that they were delivered to the job site by August 3. A4 Supp. R00956.

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<sup>139</sup> Mr. Torchio testified:

Williams Steel Erection, when they were compressed, erected the monitor, the Palm House, and the main trusses or the side trusses in the lean-to. They could not complete the lean-to steel because it hadn't been designed yet or fabricated, so they removed their crane from the job site until we had fabricated, and they're asking remobilization cost to bring their crane back in.

H.Tr., Torchio, 16:26. Mr. Torchio's reference to the lean-to steel apparently relates to the curved member located at the lean-to, which is steel, whereas the lean-to trusses are aluminum. As explained below, the curved member at the lean-to is not part of the lean-to trusses, and, as explained above, the record demonstrates that the late fabrication and delivery of the curved member at the lean-to could not have caused delay in this period because it was installed after when the critical path glazing activities could have begun.

<sup>140</sup> There is no explanation as to why it took so long to resubmit these drawings, particularly since the lean-to trusses were a critical item that directly affected when the catwalk and the installation of glazing system could begin.

<sup>141</sup> Clark does not claim that the lean-to trusses shown on the contract structural drawings or the preparation of the shop drawings for those trusses were affected by the curved member tie-in design issue, and the record otherwise indicates that the lean-to trusses and curved member tie-in are discrete elements. R4, Drawing S-203. Mr. Miranda testified that this design defect only affected the detailing of the curved member itself and the purlins in that area. H.Tr., Miranda, 17:113-15. In fact, the curved member tie-in was installed between September 18 and 22, well after erection of the lean-to trusses on August 8 and 9, 2000, and when the glazing system activities were to begin (on September 6). Compare C4 Supp. 01 01097, 01 01099 (Standard Iron erected lean-to trusses) with C4 Supp. 01 00904, 01 00906, 01 00908, 01 00910, 01 00912 (Standard Iron erected curved member at lean-to at South end of Palm House).

As indicated, the record shows that the design issues associated with the catwalks were resolved by January 11, 2000, when AOC provided its last revisions for the catwalk design. *See* H.Tr., Sullivan, 12:263-64; Miranda, 17:129-33. We have not found in the record when the shop drawings for the catwalks were submitted and approved, or when the catwalks were fabricated. However, we found documentation in the record that indicates that Standard Iron planned to deliver catwalk levels 3 and 4 to the site between July 18 and 20, 2000. A4 Supp. R00956.

Clark does not explain why it could not have fabricated and delivered the lean-to trusses and catwalks to the job site in sufficient time to allow for the erection of the lean-to trusses and catwalks soon after the erection of the monitor and main arch trusses, particularly given the critical nature of these elements that directly affected when the installation of the glazing system could begin, and inasmuch as the shop drawings for the lean-to trusses had been approved 3 months earlier and the catwalk issues were resolved 7 months earlier. Given that under Clark's as-planned schedule all of the Palm House structural aluminum and steel and catwalks would be fabricated within 49 calendar days, *see* App. Exh. 94 at 7; H.Tr., Kern, 21:156-58, the Board does not understand why the lean-to trusses and catwalks, which are only a few of the many elements that have to be fabricated, could not have been fabricated and delivered to the job site in sufficient time to allow for their erection prior to the demobilization of the Williams Steel's crane, so as to allow the glass glazing activity to commence at an earlier date.<sup>142</sup>

Thus, the record evidences that the demobilization and remobilization of the crane and the interruption and delay of the Palm House structural aluminum and steel installation activity was not caused by delays in the shop drawings and fabrication of the vestibules, curved member at the lean-to, and the Palm House/Garden Court expansion joint, but by delays in the shop drawings, fabrication and delivery of the lean-to trusses and catwalks about which elements Clark does not assert a design defect.<sup>143</sup>

It is true that the crickets were installed between August 18 and 25 (before September 1, the date which Williams Erection identified for the start of the installation of the glazing system). Mr. William O'Hanlon, an expert witness qualified in the areas of structural engineering and conservatory renovations, *see* H.Tr., O'Hanlon, 18:120-21, credibly testified that the erection of the crickets should be done before the installation of the glazing system. *Id* at 18:119. Documentation in the record indicates that the crickets and vestibules were delivered to the site no later than August 10, 2000. A4 Supp. R00956, R00957. Here too, there has been no explanation provided to help the Board understand why it apparently took Clark so long to fabricate and deliver the structural aluminum for the crickets and vestibules, where the record shows that shop drawings for these members were "approved as noted" by AOC on May 18 and 24, 2000, *see* R4, SI00181 (vestibules); SI00195 (crickets), particularly in view of Clark's

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<sup>142</sup> As noted above, one explanation is that the 49 day fabrication period was unreasonable, which, as discussed above, does not provide a basis for a compensable delay.

<sup>143</sup> We below deny Williams Steel's claim for the remobilization of the crane, which was submitted as part of Standard Iron's delay claim because Clark has not established the the remobilization was the result of government-caused delay.

as-planned schedule of fabricating all Palm House structural aluminum and steel within 49 calendar days.<sup>144</sup>

Furthermore, Clark's delay claim here too is in the nature of a total delay claim where it lists a litany of design issues that caused delay and presumes that this caused critical path delay. As described more fully in connection with Clark's change order claim associated with the Palm House/Garden Court expansion joint (Clark Change Order No. 810238), the Board does not find that the design of structural support for the expansion joint represented a design defect or was a change to Clark's contract; rather, the Board finds that it is Clark's responsibility under section 13123 of the contract to design and provide the expansion joint and any necessary connections. Moreover, while it is possible that the fabrication and installation of the crickets could have delayed the start of the Palm House glazing activities, it is apparent, for the reasons stated above, that the fabrication and installation of the curved member, vestibules and Palm House/Garden Court expansion structural support did not hold up the start of this activity, which the record shows was planned to start before these elements were installed. Clark's total delay approach has left us with no basis to find that any of the asserted design deficiencies caused delay in this period, even assuming it was not the late fabrication and delivery of the lean-to trusses and catwalks that caused this delay as the record suggests.

In sum, the Board finds that Clark has failed to demonstrate that the untimely fabrication of the vestibules, crickets, curved members at the lean-to, and the Palm House/Garden Court expansion joint, allegedly due to design deficiencies, caused any delay on the critical path in this period, such that commencement of the installation of the glazing system was delayed.

##### **5. Alignment of the Monitor**

As of September 1, 2000, the erection of the Palm House had sufficiently progressed to allow Rough Brothers to begin installing the glazing system on the monitor. *See* A4 Supp. R00959; H.Tr., Kern, 21:87. However, Rough Brothers discovered that the monitor was not sufficiently level to allow Rough Brothers to begin glazing, in that one corner of the monitor was approximately one inch higher than the diagonally opposite corner.<sup>145</sup> A4 Supp. R00546; H.Tr., Kern, 21:88. In asserting that the resolution of this issue constituted a change to the contract, Clark subsequently advised AOC that:

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<sup>144</sup> The shop drawings were marked by AOC as "Reviewed, Exceptions Noted, Resubmission Not Required." R4, SI00181, SI00195. Under the contract, where changes to the submittal are required but are of such a minor nature that fabrication and/or construction can proceed in accordance with the correction note by AOC without resubmission of the drawing, the drawing is returned to the contractor as "approved as noted." R4, K0095. As also noted by AOC, the record also does not indicate why it took so long for Standard Iron to prepare shop drawings for these elements, given that these design issues were resolved in April 2000.

<sup>145</sup> Mr. Sullivan wrote to Standard Iron that "[t]he elevations of the Monitor corners are not within allowable tolerances-therefore glass installation is not ready to begin @ the Monitor as of 9/15/00." A4 Supp. R00960.

Rough Brothers' system has . . . a "zero" tolerance for the alignment of the greenhouse system. The structural substructure has allowed tolerance per ASI grid line specifications. We, in order to make the system compatible with "zero" tolerance, have authorized Rough Brothers to perform additional adjustment work to their system to attach the steel.

R4, COF 5400. Ultimately, Rough Brothers fabricated monitor gutter clips "to alleviate the deviation in elevation along the perimeter of the monitor." A4 Supp. R00540.

Clark contends that AOC was responsible for coordinating Standard Iron's and Rough Brothers' differing tolerances, and that AOC's failure to coordinate Clark's subcontractors' tolerances delayed this period by 15 days.

This issue was the subject of Clark Change Order No. 810323, which we resolve below. In summary, we deny Clark's change request for compensation for the gutter clips because it was part of Clark's responsibility under the performance specification contained in section 13123 of the contract to provide a custom glazing system, including providing for its attachment to the aluminum structure. Thus, Clark is entitled to no delay damages associated with the resolution of this issue.

## **6. Comparison of Experts' Testimony**

With regard to this period, each party's expert's opinion differed from that taken by the party itself. For example, while Clark asserts that AOC is responsible for all 39 days of the delay, Mr. Kern only attributes 15 days of delay to AOC (for the delay in resolving the various design issues in the crickets, vestibules, curved member and expansion joint) and 8 days of delay (for the monitor bolt-holes) to Clark, and states that he was unable to assign responsibility for 16 days of delay (associated with the monitor alignment). App. Exh. 92 at 18-20. Mr. Kern did not change his opinion in this regard at the hearing. H.Tr., Kern, 21:84-88.

For the reasons detailed above, we found Mr. Kern's determination that there were 8 days of delay for the monitor bolt-hole issue was not supported by the record, which evidenced only 3 days of delay for this cause. With regard to the 16 days of delay assertedly caused by the late resolution of the design issues concerning the crickets, vestibules, curved members and expansion joint, Mr. Kern's report only specifically discussed the late resolution of the Palm House/Garden Court expansion joint. App. Exh. 92 at 19; *see* H.Tr., Kern, 21:86-87. However, as discussed above, the expansion joint issue could not have delayed the critical path of project because it was installed well after the date when Clark actually began installation of the glazing system. Under the circumstances, we give little weight to Mr. Kern's opinion regarding the delay for this period.

As described above, although Mr. Heroy used basically the same windows analysis methodology as Clark's scheduling expert, he identified somewhat different windows. Mr. Heroy's comparable window here (from mid-April 2000 to December 2000) is larger than Mr. Kern's window. Mr. Heroy's window includes not only the critical path activities associated with the erection of structural aluminum and steel and catwalks, but also a number of the Rough Brothers

critical path glazing system activities up to December 28, 2000, when he estimated that the main roof glass installation activity should have been started, but for the second lacing angle issue that caused the glazing work to be suspended (discussed below). In his report for this period, Mr. Heroy found 31 work days of delay and that weather was the cause of 2 work days or 4 calendar days of that delay, and that the reasons for the other 29 days of delay were "unknown." COD, app. B, at 16-17. In his decision, the contracting officer did not adopt Mr. Heroy's position that weather caused 4 calendar days of delay. COD, part 5.

At the hearing, Mr. Heroy testified that, based upon his review of additional evidence, he found, of the 31 work days of delay, that weather caused 2 work days of delay, that AOC was responsible for 8 work days of delay related to certain additional work relating to belt course beams, that Clark was responsible for 9 work days of delay related to the alignment of the monitor issue, and that 12 work days were left unresolved.<sup>146</sup> See H.Tr., Heroy, 24:140-41; Resp. Exh. 62. Mr. Heroy's testimony describing his analysis for this period is very general and does not provide adequate explanation to the Board as to how he arrived at his allocation of responsibility for delay.<sup>147</sup> AOC, in its post-hearing comments, does not adopt Mr. Heroy's position concerning the delay he allocated due to weather or the belt course beams. Resp. PFF, part 1, § 1.A.1, at 39-42. Also, Clark, in its post-hearing briefs, makes no claim for delay caused by weather or the belt course beams with regard to this or any other period.

With respect to Mr. Heroy's opinion that there was 8 days of delay related to certain additional work relating to the belt course beams, no evidence regarding this issue was presented at the hearing. This issue appears to have been associated with a change claim asserted by Clark that was settled during this appeal.<sup>148</sup> Under the circumstances, since Clark does not claim delay in Standard Iron's critical path activities for this cause, we decline to assign it for this or any other period.

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<sup>146</sup> Mr. Heroy did not translate these work days into calendar days.

<sup>147</sup> Mr. Heroy's testimony indicates that he did not see Clark's Superintendent's Daily Reports for part of this period, which were provided by Clark to the Board as a "Rule 4" supplement. Specifically, Mr. Heroy testified that, when he prepared his report, Clark's Superintendent's Daily Reports were not available for dates after August 5, 2000, when Clark changed its format, such that the reports then became "useless" for tracking daily field activities. H.Tr., Heroy, 24:73-74; COD, app. B, at 15. It is unexplained why Mr. Heroy did not have access to all of the Superintendent's Daily Reports.

<sup>148</sup> We believe that this issue was associated with Clark Change Order No. 810219 involving the belt course beam. This issue arose in Mr. Heroy's responses to Mr. Kern's earlier reports in support of Clark's delay claims prepared during the course of the contract. In an earlier "fragnet" analysis, Mr. Kern identified the belt course beam design as being one of the causes for delay during the windows period he was then using, which extended from May 3, 2000 through September 2, 2000. In this analysis, Mr. Kern apparently considered Kirlin's installation of the fogging system to be the critical path during at least part of the period that the Palm House aluminum structure was being erected until the belt course beam issue put the erection of the Palm House aluminum structure activity on the critical path and caused delay. C4 Supp. 05 1885. In his March 22, 2002 report, Mr. Kern recognized his earlier report's conclusions, but does not identify the belt course beam issue as a reason for delay during this or any other period. App. Exh. 92 at 27.

Mr. Heroy's assignment of 4 calendar days of delay to weather is also too general to provide the Board with any basis to accept this allocation. Clark's contract incorporated by reference the standard construction Default clause. R4, K0052. This clause provides in pertinent part that a contractor will not be charged with damages if delay in completing work arises from unforeseeable causes beyond the control of and without the fault or negligence of the contractor, such as "unusually severe weather." FAR § 52.249-10(b)(1). Mr. Heroy identified in his March 6 report that "[w]eather delayed the setting of the Palm House Monitor for 2 work days (4 calendar days) in May 2000."<sup>149</sup> See COD, app. B, at 2, 16. We have found from our review of Clark's Superintendent's Daily Reports that on Friday, May 29, 2000, "plans to set monitor were stopped due to safety concerns over weather and winds," C4 Supp. 01 01252, and on Monday, May 22, Clark reported that heavy, early morning rains prevented setting the monitor. C4 Supp. 01 01232. These reports do not identify either day as a weather day, despite the fact that there is a specific block on the forms for reporting "total weather days." As indicated, Clark has not claimed that it is entitled to delay during this period due to unusually severe weather, and the contracting officer, in his final decision, did not find any days of delay were attributable to weather. Finally, there is no evidence in the record to show that the weather delaying the setting of the monitor between May 19 and May 22, 2000 was "unusually severe."<sup>150</sup> Thus, the Board does not find that any days of delay in this period should be attributed to unusually severe weather.

Under the circumstances, we also give little weight to Mr. Heroy's opinion (admittedly based upon incomplete information) regarding the causes for delay for this period.

## **7. Period 3 Conclusion**

In sum, we find that the contract was delayed by 39 calendar days during this period, that Clark was responsible for 37.6 days of this delay, and that AOC was responsible for 1.4 days of this delay. By the end of this period, the contract had been delayed by 313 calendar days.

### **D. Period 4.**

**September 25, 2000 (Start of Glazing System Installation Activity) to April 10, 2001 (Start of Palm House Main Roof Glass Installation Activity)--Total 108 Day Delay.**

#### **1. Summary of Period 4**

At the end of Period 3, the critical path moved from Standard Iron's Palm House activities to Rough Brothers' Palm House glazing system activities. The next window in Mr. Kern's and our CPM analysis included Rough Brothers' Palm House glazing system installation activities, which were on both the as-planned and as-built critical path and which included the following:

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<sup>149</sup> His report did not identify this weather as "unusually severe."

<sup>150</sup> Generally, unusually severe weather is weather that is abnormal compared to the past weather at the same location for the same time of year. Cibinic & Nash, *Administration of Government Contracts*, at 555.

(1) installation of the monitor roof aluminum I, (2) installation of monitor roof aluminum II, (3) installation of monitor roof vents, and (4) installation of the main roof aluminum. Resp. Exh. 53. Under Clark's as-planned schedule, these activities begin on November 17, 1999 and were to be completed by when the next critical path activity, Rough Brothers' installation of the main roof glass in the Palm House, begun on February 14, 2000--a period of 89 calendar days. *Id.* In fact, these critical path activities began on September 25, 2000 and continued until April 10, 2001, when Rough Brothers began the installation of the Palm House main roof glass activity--a period of 197 calendar days. App. Exh. 92 at 22. Thus, there was a 108 calendar day delay in this period (197 - 89 = 108).

Under Clark's as-planned schedule, the installation of the monitor roof aluminum activities were to begin on November 17, 1999, followed by the installation of the monitor roof vents, and these critical path activities were to continue until January 24, 2000, when the installation of the main roof aluminum activity was to begin--a period of 68 calendar days. Resp. Exh. 53. As indicated, the record shows that work on the monitor roof aluminum activities in fact commenced on September 25, 2000 and was completed, such that the next critical path activity, the installation of the main roof aluminum, started on December 1, 2000--a period of 67 calendar days. App. Exh. 92 at 22; C4 Supp. 01 00969.<sup>151</sup> Thus, the record indicates that there was no delay in the critical path activities up to when the installation of the main roof aluminum activity commenced.

During the installation of the monitor roof aluminum, Clark's then project manager, Joseph Smith, testified that while reviewing the Palm House with Mr. Sullivan in November of 2000, he became concerned with the adequacy of the Palm House structural design because of AOC's insistence, at that time, that amendment No. 9, attachment 4, had transferred responsibility for the structural aluminum design to Clark. H.Tr., J. Smith, 15:188-89. In November, Clark employed SGH (a structural engineering firm) to review the Palm House structure, both as-designed and as-built.<sup>152</sup> See H.Tr., Russo, 20:32-33.

Charles Russo, a professional engineer with SGH,<sup>153</sup> visited the Palm House site in November of 2000; he reviewed the contract and shop drawings and the specifications, as well as the design calculations regarding the Palm House that had been provided to Rough Brothers by Mr. O'Hanlon of Ove Arup & Partners USA, a design firm that assisted Rough Brothers in the design of the Palm House glazing system, including the review of certain aspects of the Palm

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<sup>151</sup> We recognize that both Mr. Kern and Mr. Heroy report that the installation of the main roof aluminum activity commenced on December 6, 2000. App. Exh. 92 at 22; Resp. Exh. 61. However, Clark's Superintendent's Daily Reports evidence that this activity in fact commenced on December 1. We find these contemporaneous reports to be the most reliable evidence as to when this activity commenced. In addition, the record does not reflect when the monitor roof vent activity was performed, but we need not resolve this as part of this windows analysis.

<sup>152</sup> Actually, SGH was retained by, and reported to, Clark's counsel, and not Clark directly. See C4 Supp. 08 00150.

<sup>153</sup> Mr. Russo, who testified at the hearing, was qualified and accepted by the Board as an expert in structural engineering. H.Tr., Russo, 20:31.

House structural design.<sup>154</sup> *Id.* at 20:33-35. SGH performed a preliminary as-designed analysis of the Palm House, from which it concluded that there were severe overstresses in the diagonal members (lacing angles) of the main arch trusses, overstresses in the top and bottom chords of the upper aluminum trusses on the framing components with the lower lean-to truss, and local interactive overstresses of the upper compressive diagonal in the lean-to truss.<sup>155</sup> *Id.* at 20:46-51. Clark was informed of SGH's conclusions on December 5, *see* App. Exh. 84, and in a December 18 meeting SGH informed Clark that the overstresses were so severe that the lacing angles could fail; SGH provided Clark with four sketches explaining SGH's findings and recommended that Clark stop loading the structure and discuss SGH's findings with the engineer of record, DMJM. *See* C4 Supp. 08 00238-41; H.Tr., Russo, 20:68-71. On December 20, Clark delivered SGH's sketches to DMJM and informed DMJM of Clark's concerns. R4, COF 1051.

Meanwhile, installation of the monitor roof aluminum and vents, which commenced on December 1, continued. On December 22, Clark suspended this activity because of the lacing angle issue.<sup>156</sup> *See* C4 Supp. 01 00925. The record indicates that most of the main roof aluminum was installed by the time Clark suspended this activity. COD, app. B, at 16; App. Exh. 92 at 23.<sup>157</sup>

On December 21, 2000, DMJM advised AOC of Clark's "independent analysis" that indicated that "the truss is overstressed" because of the lacing angle defect. R4, COF 1071. On January 12, 2001, DMJM informed AOC that DMJM's analysis "confirmed that there was indeed a problem" and provided "sketches for a proposed retrofit to mitigate the structural deficiencies of the trusses."<sup>158</sup> DMJM also suggested an on-site meeting prior to beginning repairs. R4, COF 1051. AOC transmitted DMJM's sketches to Clark on January 18. Resp. PFF, part 1, § II.A, tab 12, at 2; R4, COF 1064-68. An on-site meeting was conducted on January 22, at which time Clark confirmed to AOC that SGH's analysis was performed on an as-designed basis. R4, COF 1058-59. While DMJM's proposed retrofit was discussed at the meeting, AOC

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<sup>154</sup> As noted above, Mr. O'Hanlon also testified at the hearing, and was qualified and accepted by the Board as an expert in structural engineering and conservatory renovation. H.Tr., O'Hanlon, 18:120.

<sup>155</sup> This review, based upon a "two-dimensional" analysis, was considered " cursory" by Mr. Russo. H.Tr., Russo, 20:44.

<sup>156</sup> Although Mr. Sullivan testified that Clark suspended installation of the Palm House main roof aluminum on December 20, *see* H.Tr., Sullivan, 13:64; *see also* App. PFF at ¶ 472, Clark's Superintendent's Daily Reports show that on December 20 and 21 Rough Brothers was continuing to install main roof aluminum and that this activity actually stopped on December 22. *See* C4 Supp. 01 00925-29.

<sup>157</sup> Mr. Heroy estimated that if Clark had not suspended installation of the main roof aluminum when it did, Clark could have begun the installation of the main roof glass (the next activity on Clark's CPM schedule) on December 28, 2000. COD, app. B, at 17. Mr. Kern determined that the installation of the main roof glass activity could have begun on December 23, but for the suspension of the glazing system installation work. App. Exh. 92 at 23. We need not resolve this conflict under our windows analysis.

<sup>158</sup> The record does not show whether or not DMJM's proposed "retrofit" solution would have resolved the overstraining in the arch trusses.

requested that an as-built study be performed by SGH. *Id.* At this meeting, AOC also informed Clark that AOC had found that the as-built arch trusses deviated from the contract design in a number of respects. Specifically AOC found that the Palm House main arch trusses (AA, AB and AC) had only 17 diagonal members, instead of the 19 required by the contract design, and that the lattice plate thickness for truss AA was three-eighths-inch and not one-half-inch as required.<sup>159</sup> AOC PFF, part 1, § II.A, tab 12, at 2; R4, COF 784, 1058. Also discussed at this meeting was Clark's use of splice (butt) welds in the arch trusses.<sup>160</sup> R4, COF 1059.

On February 5, AOC issued a cure notice to Clark indicating that the contract may be terminated for default if Clark did not remedy a variety of problems, including the following:

- a. Clark failed to make adequate progress, which endangered "timely performance" of the contract;
- b. Clark ignored CPM contract requirements for following the approved project schedule and notifying AOC of, and obtaining approval for, schedule changes;
- c. "Clark ha[d] designed and is constructing the Botanic Garden Conservatory in such a way that the aluminum trusses are incapable of supporting its glass load;"
- d. Clark had made unilateral changes to contract drawings, including
  - reducing the number of lacing angles in trusses AA, AB, AC from 19 to 17;
  - reducing the thickness of the aluminum lacing angle plate in truss AA from one-half inch to three-eighths inch;
  - using unapproved splice (butt) welds in the arch trusses; and
  - failing to provide Clark's load analysis to AOC, including calculations, upon request.
- e. Clark had not followed mandatory contract procedures for making changes;
- f. Clark had systematically ignored the contract submittal process;
- g. Clark had fabricated the monitor trusses prior to obtaining AOC's approval of the shop drawings; and
- h. Clark had fabricated the Palm House purlins (tagged as C5) without an approved shop drawing

App. Exh. 52.

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<sup>159</sup> Clark provided a response from Standard Iron to AOC's concerns on January 24, in which Standard Iron stated that the trusses were all fabricated and installed in accordance with shop drawings approved by AOC/DMJM. R4, COF 1056-57.

<sup>160</sup> These welds are variously referred to full penetration splice welds or butt welds, which Mr. Russo testified were the same thing. H.Tr., Russo, 20:160-61.

Clark responded to AOC's cure notice in a February 20 letter, in which, as pertinent to the Palm House repairs, Clark disagreed with AOC's belief that Standard Iron had deviated from its approved shop drawings. Clark nevertheless agreed that the as-built condition of the Palm House deviated in some respects from the contract design, and informed AOC that, given Clark's concerns with the adequacy of the Palm House design, Clark had retained SGH to evaluate the as-built conditions and determine necessary repairs. C4 Supp. 08 00057-58. In response to AOC's cure notice, Clark requested that SGH join its project team, "assuming the role of engineer of record for the aluminum super-structure and analyzing it to make sure that this structure was compliant with the contract documents and code compliant." H.Tr., Russo, 20:74-75.

On February 23, while its review of the as-built conditions of the trusses was continuing, SGH provided its recommendations to Clark for arch truss repairs. App. Exh. 87. Although SGH noted that its repair evaluation to date was based upon a two-dimensional analysis, SGH stated that the results were not likely to be altered under a three-dimensional evaluation (which SGH later performed and which confirmed that the lacing angles needed to be repaired). *Id.* SGH recommended that repairs be made to the lacing angles of trusses AA, AB and AC. *Id.* Clark forwarded SGH's recommendations to AOC on February 27; Clark informed AOC that, although it disagreed that Clark was responsible for the structural design of the Palm House or the recommended repairs, it would proceed with the repairs unless AOC disagreed with SGH's approach and notified Clark promptly. R4, COF 1008.

AOC and Clark met on March 1 to discuss SGH's proposed repairs. H.Tr., Russo, 20:86; R4, COF 789-90. Clark was requested to provide a position paper on why Clark should proceed with SGH's repairs in advance of a three-dimensional analysis. R4, COF 0988. In a March 5 letter, Clark informed AOC that the lacing angle repairs would not be affected by the three-dimensional analysis and that doing the repairs would advance the project. *Id.*

Between March 6 and March 13, Standard Iron performed the arch truss lacing angle repairs indicated by SGH. A4 Supp. R00693; H.Tr., Sullivan, 13:71. Subsequent to the lacing angle repairs, between March 13 and March 22, Clark performed testing and repair of the butt welds in the arch trusses. A4 Supp. R00693. Specifically, Clark hired a professional engineer, John Lugmeyer, who performed ultrasonic testing of the welds, and Clark replaced any weld that Mr. Lugmeyer questioned.<sup>161</sup> H.Tr., Sullivan, 13:74-78.

On March 15, Clark informed AOC that SGH had performed a three-dimensional analysis and found that there were other areas in the Palm House where structural repair work was needed. R4, COF 0983. Specifically, SGH found that, in addition to the repairs to the lacing angles of the main arch trusses, repairs were necessary for the chords of the monitor trusses, the intermediate lattice girder/tension ring, and the ridge truss. C4 Supp. 08 00148. AOC and Clark met on March 16 to discuss SGH's findings. H.Tr., Russo, 20:94. Mr. Russo testified that the "only comments that we got on our recommendations was the aesthetics. [That is,] what's that going to look like?" *Id.* at 20:95.

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<sup>161</sup> The record shows that ultrasonic testing of the butt welds "produced unfavorable results of approximately 50%." A4 Supp. R00846 at 1.

Subsequently, between March 20 and 28, SGH generated a number of sketches for various additional Palm House repairs, and SGH issued a March 30, 2001 report (subsequently revised on April 9, 2001) to Clark explaining SGH's analysis and describing the necessary repairs. A4 Supp. R00864. All of these repairs were performed between March 21 and April 13. See A4 Supp. R00693. On April 10, Clark began the next critical path activity, the installation of the Palm House main roof glass, which ended Period 4. C4 Supp. 01 00246; App. Exh. 92 at 22.

After the majority of the repairs had been performed, in April of 2001, AOC employed James Lakey of Cagley & Associates (a structural engineering firm) to review the construction documents and SGH's recommendations, and to issue an opinion as to whether the repairs performed by Clark were necessary.<sup>162</sup> H.Tr., Lakey, 27:17, 20, 24. Subsequently, Cagley issued an August 17, 2001 report, which agreed with SGH's repair recommendations with the exception of the repairs to the intermediate lattice girders (which Cagley considered unnecessary), see A4 Supp. R00862, and a revised April 26, 2002 report, which also agreed with most of SGH's repair recommendations, with the additional exception of the repairs to the roof truss (which Cagley also considered unnecessary).<sup>163</sup> See A4 Supp. R00863.

## 2. Clark's and AOC's Contentions

Clark argues that the sole reason for delay in this period was the suspension of Rough Brothers' installation of the glazing system aluminum and that this suspension was necessary to repair design deficiencies for which AOC was responsible. App. PFF ¶¶ 309, 310. These repairs were to the "web lacing angles of the main arch trusses, the chords of the monitor trusses, the intermediate tension ring, and the ridge truss . . . ." C4 Supp. 08 00148.

AOC does not dispute that the Palm House design was defective in a number of regards, requiring repairs during this period. Specifically, AOC admits that the arch truss lacing angle design was deficient and that repairs to the main arch trusses were necessary. In fact, AOC agrees that most of the repairs performed by Clark in this period were necessary. COD, ch. 3, at 18-19. The only repairs questioned by AOC were the repairs to the intermediate tension ring and ridge truss members, as identified by Mr. Lakey in his August 17, 2001 and April 26, 2002 reports. A4 Supp. R00862; R00863. AOC also points to instances where the as-built Palm House deviated from the contract design, which issues were raised in the February 5 cure notice, and implies that they may have contributed to the structural problems and asserts that addressing some of these issues contributed to the delay in this period. Resp. Reply Brief, part 1A, at 33-34. Finally, in its reply brief, AOC argues that Clark, in performing the repairs during this period, acted without AOC's direction and as a volunteer, and that, therefore, any delay associated with making any of these unnecessary repairs was delay for which Clark was responsible. *Id.*

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<sup>162</sup> Mr. Lakey also testified at the hearing, and was qualified and accepted by the Board as an expert in structural engineering. H.Tr., Lakey, 27:23.

<sup>163</sup> Although Cagley's second, revised report actually bears the date April 26, 2001, the report was issued April 26, 2002. H.Tr., Lakey, 27:48.

### 3. Did Clark Act as a Volunteer?

The Board first finds that Clark acted appropriately and not as a volunteer in suspending work on the Palm House until an analysis of the structure could be performed and until undertaking the repairs found necessary by SGH. Clark's and AOC's structural engineering experts agreed that the vast majority of the repairs needed to be made. In fact, in the contracting officer's decision, AOC admits that Clark's suspension of work was "prudent." *See* COD, ch. 3, at 14.

The record also shows that AOC and DMJM were promptly and continuously apprised by Clark of the overstress problems with the Palm House structure design and of Clark's proposed repairs. *See, e.g.*, R4, COF 1071 (DMJM December 21, 2000 notification to AOC that Clark had an "independent analysis" regarding possible overstressing of main trusses); R4, COF 1051 (DMJM January 12, 2001 notification to AOC that DMJM's "calculations" confirmed SGH's findings that there was a problem); R4, COF 1008 (Clark forwarded to AOC SGH's recommendations for repairs); H.Tr., Russo, 20:86, 94 (March 1 and 16 meetings between Clark and AOC to discuss Clark's proposed repairs); and R4, COF 0972-80 (on March 22, Clark forwarded to AOC SGH's sketches for repairs). Despite being repeatedly informed of Clark's plans for repairs, AOC did not object to Clark's performance of the repair work until after all the repairs were performed.

Furthermore, at the time Clark was analyzing the adequacy of the as-built and as-designed aluminum structure, Clark was under considerable pressure from AOC concerning timely performance of the contract. That is, shortly after Clark's notice to AOC of Clark's concerns that the main arch trusses were severely overstressed, AOC issued to Clark the February 5 cure notice that threatened a termination for default for, among other things, failing to timely perform the contract. *See* App. Exh. 52. The cure notice also complained that "Clark ha[d] designed and is constructing the Botanic Garden Conservatory in such a way that the aluminum trusses are incapable of supporting its glass load." *Id.* We find that this statement, coupled with AOC's earlier statements to Clark that it was Clark's responsibility under amendment No. 9, attachment 4, to provide all necessary design work associated with the conservatory system, *see e.g.*, R4, LTR 2356, reasonably led Clark to believe that it was now Clark's responsibility to investigate and undertake repair of the defective aluminum structure.<sup>164</sup>

In this regard, Peter Forster, Chairman and CEO of Clark Construction Group, testified that receipt of the cure notice after Clark had informed AOC of SGH's findings caused Clark to feel compelled to take on "extraordinary responsibility" to perform the repairs. Specifically, as a result of being threatened with termination for default for failure to perform and because it appeared that AOC would not direct DMJM to review the deficiencies identified by SGH in the government's design, Clark felt pressured to act unilaterally to move the project forward, but kept AOC informed of Clark's actions. H.Tr., Forster, 12:111-14.

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<sup>164</sup> In its October 28, 2002 report, SGH states that in the March 1, 2001 meeting with AOC, SGH "conveyed to the representatives of AOC and DMJM that [SGH] understood that the AOC had transferred design responsibility for the aluminum framing of the Palm House to Clark, and that on Clark's behalf, we would be performing our work as engineer of record," and that "no one from the AOC or DMJM denied that design responsibility was transferred to Clark and that SGH would serve as engineer of record." C4 Supp 08 00155.

Although we are mindful of the need to protect the government from bearing the costs of contractors who perform extra work beyond the government's determined need (*i.e.*, contractors acting as volunteers), here the work performed was to correct deficiencies for which AOC itself had a duty and need to correct. See *B.V. Constr., Inc.*, ASBCA Nos. 47,766 *et al.*, April 22, 2004, 04-1 BCA ¶ 32,604 at 161,354-55. Furthermore, AOC, through its words and actions, reasonably informed Clark that AOC's position was that it was Clark's responsibility to perform the repairs to allow the activity in this period to continue. Under the circumstances, we do not conclude that Clark is a volunteer that is not entitled to recover damages for the delay associated with repairing the Palm House structure during this period.

#### 4. Lacing Angle Repairs

As noted above, AOC concedes that the lacing angles were defective and the resultant repairs caused delay. However, Mr. Heroy calculated that AOC was only responsible for delay for the lacing angle repairs between December 28, 2000 (his projected start date for glass installation) and January 29, 2001 (the date that Mr. Heroy believes Clark could have begun the lacing angle repairs), a total of 21 work days (approximately 29 calendar days). In this regard, Mr. Heroy notes that on January 12, 2001, DMJM confirmed that there was a problem with the lacing angles and this culminated in a January 22 meeting between Clark and AOC, where a proposed DMJM fix, which Mr. Heroy understood was similar to the fix ultimately designed by SGH, was discussed. See H.Tr., Heroy, 24:122-26. Thus, Mr. Heroy assigned responsibility for the 17 work days of delay between December 28, 2000 and the January 22, 2001 meeting to AOC, and also assigned to AOC an additional 4 working days after the January 22 meeting "until you would get going the next week." *Id.* at 24:127. Because Clark did not actually begin the lacing angle repairs until March 6, Mr. Heroy assigned responsibility for the 26 work days of delay (approximately 36 calendar days) between January 29 and March 6 to Clark. Resp. Exh. 61.

As indicated above, underlying Mr. Heroy assignment of 26 work days of delay to Clark in this period is Mr. Heroy's conclusion that 4 days after the January 22 meeting Clark could have begun the lacing angle repairs. *Id.* The record does not support this conclusion. Rather, at the on-site January 22 meeting, AOC learned that SGH's initial evaluation was based on an as-designed basis and requested that Clark perform an analysis of the as-built condition of the Palm House, which Clark agreed to provide. R4, COF 1058-59. At this meeting, AOC also expressed concern with deviations in the as-built arch trusses from the contract design (that is, the arch trusses had fewer diagonal members, truss AA had an undersized lattice plate, and the trusses contained butt welds). *Id.* While it is true that DMJM's fix was discussed at this meeting, DMJM also indicated that it was not certain that it would work without more study of the as-built configuration.<sup>165</sup> *Id.*

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<sup>165</sup> As indicated above the record does not demonstrate that this DMJM fix would have worked. As Mr. Heroy was not qualified as an expert in structural engineering, we will not accept his opinion that the DMJM fix was similar to the ultimate SGH fix, or that the DMJM fix would have fixed the problem, in the absence of other evidence in the record or testimony from an accepted structural engineering expert that supports Mr. Heroy's opinion.

As noted above, during this same period, AOC issued the February 5 cure notice to Clark concerning, among other things, the deviations in the trusses from the contract design. SGH considered the impact of these deviations as a part of its analysis of the as-built structure, and found that these deviations did not impact the need to perform the arch truss lacing angle repairs and other structural repairs. *See* H.Tr., Russo, 20:161, 165-67. Clark and AOC met on March 1 to discuss SGH's findings and proposed repairs, *see* R4, COF 0789-90, and thereafter, on March 5, Clark informed AOC (in response to AOC's request) that SGH's determination that lacing angle repairs were necessary, which was originally based upon a two-dimensional analysis, was not changed by SGH's three-dimensional analysis. R4, COF 0988. Thus, we find no basis in the record to conclude that Clark could have proceeded with the repairs prior to March 6, as suggested by Mr. Heroy. Rather, we conclude that AOC was responsible for all of the delay associated with the lacing angle repairs and other necessary Palm House structural repairs during this period.

## 5. Other Palm House Structural Repairs

The Board has been presented with numerous reports from the parties' structural engineering firms, SGH and Cagley, and from DMJM, and has received testimony from the parties' structural engineering experts, Msrs. Russo and Lakey. Although there are differences in the analytical models and factors used by these firms, there are also substantial areas of agreement. For example, whereas DMJM used a two-dimensional model in designing the Palm House structure and SGH's initial review was based upon a two-dimensional analysis, all three firms (including DMJM in its February 2002 report) ultimately used a three-dimensional analysis, which was concluded to be more accurate. *See, e.g.*, C4 Supp. 08 00165. Ultimately, the parties agreed upon the necessity of most of the Palm House repairs. A4 Supp. R00863. However, the parties disagree as to the necessity of repairs to the inner and outer chords of the intermediate lattice girders (SGH's sketches 5R and 6R) and to the ridge trusses (sketches 1 and 2). C4 Supp. 08 00165, 08 00210-11, 08 00216-17; A4 Supp. R00863 at 10.

### a. Intermediate Tension Ring Repairs

In its first report, dated August 17, 2001, Cagley agreed with Clark that most of the repairs recommended by SGH were necessary "for the structure to be compliant with BOCA 1993, the design code for the project." A4 Supp. R00862 at 1. Like Mr. Russo, Mr. Lakey found a three-dimensional analysis to be more accurate than a two-dimensional model, as was used by DMJM in designing the structure. *Id.* at 5. Mr. Lakey also found, however, that "[a] major issue in the three-dimensional analysis of the Palm House was whether or not the purlins were connected to the main arch trusses, such that they acted like additional tension rings and wind bracing."<sup>166</sup> *Id.* at 7. Mr. Lakey found that if only the three lattice girders/tension rings were considered as providing support (as SGH considered in its analysis), and the purlins were not

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<sup>166</sup> The purlins are horizontal aluminum structural members in the roof that act as "channels that frame from main arch truss to main arch truss, and they provide direct support for the conservatory framing system." *See* H.Tr., Torchio, 15:246-47; Lakey, 27:36. The purlins in question here are the so-called BOCA purlins that were added to the structure by Rough Brothers prior to the time that this lacing angle problem emerged and which are the subject of Clark Change Order No. 810028 (discussed below).

considered, then all of the repairs recommended by SGH were necessary. *See* A4 Supp. R00862 at 11. However, if the purlins in the Palm House were considered in the analysis, then the repairs to the intermediate tension ring were unnecessary. *See* A4 Supp. R00862 at 11. Mr. Lakey indicated that this judgment was dependent on whether the purlins were found to “take axial load” and thus “contribute to the performance of the structural frame as a whole,” and in this case, Mr. Lakey concluded, in his opinion, that the purlins did perform this function. *Id.*; H.Tr., Lakey, 27:37. In sum, Cagley concluded in its first report that all of the repairs recommended by SGH were necessary, except for the repairs to the intermediate tension ring.<sup>167</sup> A4 Supp. R00862 at 1, 11. In its subsequent April 26, 2002 report, which also accounted for the purlins, Cagley did not change its conclusion that the intermediate tension ring repairs were unnecessary. A4 Supp. R00863 at 10.

Clark contends that Mr. Lakey’s reliance upon the purlins in his three-dimensional analysis of the structure was “inappropriate” because Cagley did not analyze the connections of the purlins to the trusses to assess whether the purlins could appropriately be considered a “part of the tension resisting system.” App. Reply Brief at 65. In this regard, Mr. Lakey admitted, in response to Clark’s cross-examination, that in order to use the purlins as part of a tension resistant system that the connections of the purlins to the trusses would have to be analyzed, and that Mr. Lakey could not recall whether such an analysis was performed by Cagley. H.Tr., Lakey, 27:86-93. In this regard, neither of Cagley’s reports demonstrates that such an analysis was performed, and no calculations supporting such an analysis have been provided.

AOC responds that Mr. O’Hanlon, another of Clark’s structural engineering experts, testified that the purlins function to support and “brace the tr[us]ses structurally.” Resp. PFF, part 1, § II.A, tab 12, at 11; H.Tr., O’Hanlon, 18:55, 207. Since Mr. O’Hanlon testified that the purlins function to support the arch trusses, AOC essentially asserts that Cagley appropriately considered the purlins in its three-dimensional model. Resp. PFF, part 1, § II.A, tab 12, at 11. AOC also questions why Clark did not analyze the “bracing effect of the newly added BOCA purlins” in determining whether these repairs were necessary. *Id.* at 11-12.

Clark replies that “Mr. O’Hanlon did not testify that the purlins could be considered as tension resisting members, rather he testified that they are a part of the primary structure because they brace the main arch trusses reducing their unbraced length.” App. Reply Brief at 65, *citing* H.Tr., O’Hanlon, 18:54-55. Clark does not respond, however, to AOC’s assertion that Clark should have considered the purlins in its analysis of the adequacy of the structure.

While we agree with Clark that Mr. O’Hanlon did not testify that the purlins could be considered tension-resisting members, we note that he also did not testify that they could not be considered tension-resisting members. Mr. O’Hanlon did testify, however, that “my experience has been on

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<sup>167</sup> In its three-dimensional model, which included consideration of the purlins, Cagley, in its independent engineering judgment, used different live loading for the structure than that provided by the contract design documents. H.Tr., Lakey, 27:83-85. Specifically, Cagley applied a live load of 40 per square foot (psf) for catwalk levels 2, 3, and 4, A4 Supp. R00862 at 5, although the contract design documents required that the structure be built to accommodate live loading of 50 psf for these catwalks. R4, Drawing S001.

other conservatories, that the purlins are placed where they're needed to go to brace the tr[us]ses structurally," *see* H.Tr., O'Hanlon, 18:207, and that the purlins function to brace the trusses, and "[w]ithout them, the trusses would tend to buckle." *Id.* at 18:55. The Board fails to see the distinction that Clark seeks to draw between Mr. Lakey's and Mr. O'Hanlon's testimony regarding the use of the purlins to provide support to the trusses. In fact, we find from our review of these experts' testimony that Mr. Lakey and Mr. O'Hanlon essentially agree that the purlins can function (and often do in conservatories) to provide support for the structure.

There appears to be no dispute that the question of whether or not the purlins here provide support to the Palm House structure, such that repairs to the intermediate lattice girders were necessary or unnecessary, depends upon the sufficiency of the connection of the purlins to the trusses. *See* H.Tr., Lakey, 27:91-93; C4 Supp. 08 00165. Here, Clark has adequately demonstrated that AOC's expert, Mr. Lakey, did not perform such an analysis to determine whether the purlins could be used as a tension rings in the manner applied by Mr. Lakey in his three-dimensional analysis.

The problem here, however, is that it is unrebutted that Clark did not evaluate at all whether the purlins could serve as tension rings supporting the structure such that repairs to the intermediate lattice girder may not have been necessary.<sup>168</sup> There is also no explanation in the record (or even argument from Clark) as to why Clark did not assess the affect of the purlins on the Palm House structure and whether consideration of the purlins would have made repairs to the intermediate lattice girders unnecessary. Absent such an analysis (or an explanation as to why one was not done), we do not find that Clark has provided sufficient evidence showing that the repairs to the intermediate lattice girders were necessary, given Mr. Lakey's and Mr. O'Hanlon's expert testimony that purlins can serve as tension rings to support the structure.<sup>169</sup>

Given the fact that Clark failed to demonstrate that repairs to the intermediate lattice girders were necessary, we find on this record that these repairs were unnecessary and that Clark is responsible for the delay associated with performing these repairs. Mr. Heroy determined that there were 3 work days where "unnecessary repairs" (which included both the intermediate lattice girder and ridge truss repairs) were made, extending from March 23 through March 28, and he assigned Clark responsibility for these 3 work days of delay. Resp. Exh. 61. The period identified by Mr. Heroy is actually 6 calendar days. The record shows that the intermediate lattice girder repairs were performed beginning on March 24 and finishing on March 28 (SGH sketches 5R and 6R)--a period of 5 calendar days. A4 Supp. R00693. The record also shows that on 2 of these days, March 27 and 28, while Clark was continuing to perform the unnecessary

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<sup>168</sup> Mr. Russo provided no testimony on this point.

<sup>169</sup> We determine below, with regard to Clark Change Order No. 810028, which denied Clark's request for equitable adjustment on behalf of Rough Brothers for adding these purlins, that the additional purlins were not required by the contract design, but were only necessary because of the glazing system design chosen by Rough Brothers. Nevertheless, the fact remains that these purlins were in fact added to the Palm House structure and, as testified to by Clark's and AOC expert witnesses, these purlins serve to support the structure as well as the glazing system. Because the purlins are part of the Palm House structure, we find that their possible impact on supporting the structure should have been considered before Clark undertook these repairs.

intermediate lattice girder repairs, Clark also performed the necessary repairs for the upper tension ring (SGH sketches 7A and 11A and B).<sup>170</sup> *Id.*

Based on the foregoing, we find that Clark was solely responsible during this period for 3 days of delay from March 24 through March 26 caused by the unnecessary intermediate lattice girder repairs, and that there were concurrent causes for 2 days of delay on March 27 and March 28 where both the unnecessary intermediate lattice girder repairs and the necessary upper tension ring repairs were done.

#### b. Ridge Truss Repairs

As indicated above, 8 months after its first report, on April 26, 2002, Cagley issued a second report to AOC, in which it concluded that, in addition to the repairs to the intermediate lattice girder, the repairs to the ridge truss were also unnecessary. *See* A4 Supp. R00863 at 10. As in its first report, Cagley used a three-dimensional model that relied upon the upper and lower lattice girders and five rings of purlins as tension rings. In the second report, Cagley used the same model, but applied a different, reduced live load for the maintenance level catwalks (levels 3 and 4). *Id.* at 1; H.Tr., Lakey, 27:49-50. Specifically, in its first report, Cagley applied a live load of 40 psf for the maintenance level catwalks, which, as we noted above, was lower than the 50 psf loading specified in the contract design drawings for these catwalks.<sup>171</sup> A4 Supp. R00862 at 5. In the second report, Cagley applied an even more reduced 700-pound point load to the catwalks, rather than the uniform 40-psf load across the maintenance level catwalks that Cagley applied in the first report.<sup>172</sup> A4 Supp. R00863 at 6. The record shows that Cagley revised its opinion and reduced the live load applied to the maintenance level catwalks as a result of a March 2002 meeting with AOC and DMJM, at which Cagley agreed with DMJM that a 700-pound point load reflected a reasonable load that would be actually applied to these catwalks.<sup>173</sup> *See* H.Tr., Lakey, 27:84-85. The effect of applying this reduced load to the maintenance level catwalks was to take “a lot of load off the structure,” *id.* at 27:54, such that although the connections at the ridge truss were still stressed, they were not over-stressed. *See* H.Tr., Russo, 20:197-98; C4 Supp. 08 00169.

There is no dispute that it is the reduction in the live load applied to the maintenance level catwalks that caused Cagley to conclude in its second report that the repairs made by Clark to the

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<sup>170</sup> AOC does not argue that the upper tension ring repairs were unnecessary.

<sup>171</sup> Although Cagley only applied a 40 psf live load to the maintenance level catwalks in its first report, Cagley nevertheless originally agreed with SGH that the ridge truss repairs were necessary. A4 Supp. R00862 at 5, 10.

<sup>172</sup> The application of a load of 40 or 50 psf to a catwalk means that for every square foot of the catwalk, one would apply 40 or 50 pounds of load, which is “a significant amount of load.” H.Tr., Lakey, 27:54. In contrast, a point load of 700 pounds means that the catwalk would be designed to hold 700 pounds at a particular point. H.Tr., Russo, 20:256-57.

<sup>173</sup> Mr. Lakey explained that a 700-pound point load was intended to reflect “two men and a bucket;” that is, the weight of two 200-pound individuals and their tools, which is all the catwalk would be required to withstand as loading. H.Tr., Lakey, 27:55-56.

ridge truss were unnecessary. AOC argues that this reduction in the loading to be applied to the catwalks was justified because the 700-pound point load reflects the loading that would actually be applied in the use of the maintenance level catwalks. The contract design documents required, however, that the maintenance level catwalks bear a live load of 50 psf, R4, Drawing S001, and the use of a 700-pound point load for these catwalks was inconsistent with the design requirements. H.Tr., Lakey, 27:77.

It is without question that AOC could change the contract requirements, including the loading to be applied to the structure, under the contract's Changes clause. Here, however, AOC decided to change the loading requirements for the maintenance level catwalks after the ridge truss repairs were already performed. Clark's obligation under the contract was to provide a conservatory structure in accordance with the contract requirements, which included fabricating and installing catwalks that satisfied the contract live load requirements. We find that in analyzing the as-built condition of the structure Clark and SGH could not ignore the load requirements of the contract, as AOC apparently now believes. Moreover, AOC and DMJM were aware in March 2001, prior to the repairs to the ridge truss being performed, that Clark was applying the contract load requirements in analyzing the as-built condition of the structure. If AOC wished to lower the live loading to be applied to the maintenance level catwalks for the purposes of determining whether the ridge truss repairs were necessary, AOC should have done this prior to the repairs being performed. Accordingly, the Board does not credit Mr. Lakey's revised report that found that the ridge truss repairs were unnecessary.

The Board finds based upon this record that the repairs to the ridge truss, which were all performed on March 23, were necessary and assigns responsibility for the 1-day delay associated with these repairs to AOC. See A4 Supp. R00693.

## 6. Other Structural Issues

AOC points to the instances noted in the February 5 cure notice where Clark deviated from the contract design. Specifically, AOC objects that the main arch trusses contained only 17 lacing angles, rather than the 19 required by the contract design, and that the lattice plate thickness for truss AA was three-eighths-inch, rather than one-half-inch as required by the contract design. AOC implies, but does not state, that these deviations may have contributed to the Palm House structural issues and thus the associated contract delay during this period. Resp. Reply Brief, part 1A, at 33-34. AOC also notes that the arch trusses contained splice (butt) welds that were not provided for by the contract documents; Mr. Heroy calculated that Clark was responsible for 8 work days, or 10 calendar days, of delay associated with repairing the butt welds (between March 13 and March 23).<sup>174</sup> *Id.*; Resp. Exh. 61.

Clark contends that these deviations were actually identified in Standard Iron's shop drawings, which AOC approved, and that, in any event, these deviations had no impact on the need to

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<sup>174</sup> The record shows that butt weld repairs were completed by March 22, rather than March 23, as Mr. Heroy found. See A4 Supp. R00693.

perform repairs on the Palm House structure.<sup>175</sup> In this regard, Clark has presented the expert opinion of Mr. Russo that these deviations (the 17 angles, the three-eighths-inch truss AA lattice plate, and the butt welds) did not impact the need to perform repairs in this period and were not the source of the deficiencies for which the repairs were needed. *See* H.Tr., Russo, 20:161, 165-67.

Furthermore, Mr. Sullivan testified that at the time Clark was performing the butt weld inspections and repairs, the installation of the glazing system aluminum remained suspended because Clark had not yet received SGH's final recommendations for repair, so any such repairs did not cause delay.<sup>176</sup> H.Tr., Sullivan, 13:79-80. Mr. Sullivan also persuasively testified in some detail that, but for the need to perform the other repairs, the installation of the aluminum and glass in the Palm House glazing system could have continued at the same time the butt weld repairs were being performed. *Id.*

AOC has not presented any evidence or expert testimony to rebut Mr. Russo's expert opinion or Mr. Sullivan's testimony. In fact, the reports prepared by AOC's structural engineering expert, Mr. Lakey, do not even address the impact, if any, these deviations had upon the integrity of the Palm House structure or the need for repairs. In this regard, the Board takes notice that ultimately no contract action was taken by AOC with respect to these deviations, and that the arch trusses today have only 17 lacing angles and that truss AA continues to have a lattice plate thickness of only three-eighths-inch. Furthermore, the butt welds were inspected and repaired at Clark's expense during a time when the installation of the main aluminum and the start of the next activity (the installation of the Palm House main roof glass) had already been suspended. The Board finds that these deviations from the contract design did not affect the need for repairs in this period or the delay associated with investigating, engineering, and performing these necessary repairs.

## **7. Comparison of Scheduling Experts' Opinions**

As noted above, the parties' scheduling experts used different windows in analyzing delay under the contract, which causes some problems in comparing the experts' conclusions for this period.

We have adopted Mr. Kern's window for purposes of our analysis of contract delay during this period. Although Mr. Kern assigns responsibility for all of the 108 days of delay in this period to AOC, *see* App. Exh. 92 at 23, we find, as discussed above, that Mr. Kern's analysis did not account for the 5 days of delay (3 days Clark's sole responsibility and 2 days concurrent delay) caused by Clark's unnecessary repairs to the intermediate lattice girders.

The window used by Mr. Heroy that is pertinent to this period began on December 28, 2000, which was the date he estimated that installation of the main glass activity would have begun but

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<sup>175</sup> Standard Iron's shop drawings do not clearly note these deviations, as was required by the contract. *See* R4, K0034.

<sup>176</sup> Mr. Sullivan testified that the butt weld repairs were completed by March 20, H.Tr., Sullivan, 13:78-79, which was the date that SGH issued its eight repair sketches. The record shows, however, that the butt weld repairs continued until March 22. A4 Supp. R00693.

for the discovery of the Palm House design defects, which resulted in the suspension of work by Clark.<sup>177</sup> Mr. Heroy's window extended to September 30, 2001, when he believed there was substantial completion of the contract.<sup>178</sup> Resp. Exh. 61. Based on his windows analysis, he determined that there was a "total delay" of 71 work days as of time the installation of the main roof glass activity began and that Clark was responsible for 37 of those work days and AOC for 34 of those work days.<sup>179</sup> *Id.*

For the reasons discussed above, we did not accept Mr. Heroy's assignment to Clark of responsibility for much of the delay during this period, for example, his assignment of 26 work days of delay for the lacing angle repairs and his assignment of 8 work days of delay for the butt weld repairs. *Id.* Mr. Heroy's calculations regarding the impact of the alleged "unnecessary" repair work (the repairs to the intermediate lattice girder and ridge trusses as identified on SGH's sketches 1, 2, 5R and 6R), which were performed from March 23 to 28 (6 calendar days), were consistent with the record. *Id.* For the reasons stated above, we found that Clark was solely responsible for 3 of these calendar days, AOC for 1 of these calendar days, and that there were concurrent causes for 2 of these calendar days.

As indicated, Mr. Heroy's analysis combined this period when the work was suspended with the last portion of the contract (Mr. Kern's Period 5). As discussed below, in Period 5, the total delay was significantly mitigated by the time of substantial completion of the contract. In his analysis, Mr. Heroy determined that the 71 work days of the "total delay" was subsequently mitigated by 22 work days (during Period 5), such that there were 49 total work days of "effective delay" for this period. *Id.* To account for how this mitigation affected the parties' respective responsibilities for delay, Mr. Heroy credited each party with what he determined was their allocable share based upon what he believed to be their relative responsibility for the delay during this windows period. *Id.* That is, Mr. Heroy allocated 52 percent of the delay to Clark (37/71) and 48 percent of the delay to AOC (34/71), which percentages he applied to the total 49 work day effective delay for this period to allocate responsibility for 25 work days (or 35 calendar days) of the delay to Clark and 24 work days (or 34 calendar days) to AOC. *Id.*; COD, app. B, at 17-19.

Where, as here, delay is mitigated at the end of the contract, this mitigation has the effect of lessening the total contract delay to date, given that the causes for the total contract delay resulted from events occurring throughout the contract term. Thus, we find that Mr. Kern's approach of performing a separate windows analysis for the mitigation period to be of more

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<sup>177</sup> As indicated, Mr. Kern estimated this date as December 23, 2000. App. Exh. 92 at 23.

<sup>178</sup> As noted above, the results (although not the logic of Mr. Heroy's analysis) are affected by his belief that substantial completion occurred on September 30, 2001, although the parties now agree that substantial completion occurred on August 31, 2001.

<sup>179</sup> Mr. Heroy measured the 71 work day delay as the difference between his estimate of what the start date for installation of the main roof glass activity should have been if the design defect had not been discovered (December 28, 2000) and the actual starting date of that activity, which he determined was on April 9, 2001. Resp. Exh. 61. As noted above, we found that the installation of the main roof glass actually began on April 10, 2001, as asserted by Clark and its scheduling expert. See C4 Supp. 01 00246.

value to the Board in allocating responsibility for the delay, and in calculating the amount of delay and acceleration costs that should be reimbursed, than Mr. Heroy's analysis of only considering the delay mitigation in analyzing one of the several periods of delay under the contract. Therefore, we will separately consider the delay mitigation period as did Mr. Kern.

## **8. Period 4 Conclusion**

We find that the contract was delayed 108 calendar days during this period. We find that AOC was responsible for all of the delay during this period, which was primarily caused by the suspension of critical path work while the Palm House structural repairs necessitated by the defective design were performed, except for the 3 days of delay solely caused by Clark's unnecessary repairs and the 2 days of concurrent delay where Clark also performed unnecessary repairs while necessary repairs were also being performed. Thus, AOC is responsible for 103 days of delay during this period.

### **E. Period 5.**

**April 10, 2001 (Start of Installation Palm House Main Roof Glass through August 31, 2001 (Substantial Completion) (61 Days Acceleration/Mitigation to Contract Completion).**

#### **1. Summary of Period 5**

As indicated above, the contract work went back on track with Rough Brothers' completion of the installation of the main roof aluminum and the Palm House remedial work, and after that date the total contract delay was mitigated. The record showed that the critical path moved to Rough Brothers' installation of the main roof glass activity on April 10, 2001. This event represents the beginning of the last windows period of Mr. Kern and this Board in analyzing the delay under this contract.

The first planned critical path activity in this period was Rough Brothers' installation of main roof glass I.<sup>180</sup> Resp. Exh. 53. The approved baseline schedule showed that the critical path portion of the installation of main roof glass activity extended from February 14 through March 3, 2000--18 calendar days. *Id.* According to Mr. Heroy, the critical path portions of this activity were completed by either April 27 or May 1, 2001, although, according Mr. Kern, the non-critical path portions of main roof glass installation activities continued until June 28. App. Exh. 92 at 3; Resp. Exhs. 61, 62.<sup>181</sup>

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<sup>180</sup> According to the baseline schedule, the remainder of the installation of the main roof glass activity (II) was not on the critical path, but was to be installed while the catwalk electrical activities became the critical path. Resp. Exh. 53; Clark Baseline CPM Schedule.

<sup>181</sup> Mr. Kern's report does not identify the precise date when the critical path aspect of the installation of the main roof glass activities moved to the next critical path activities, Judd's catwalk electrical work. App. Exh. 92 at 25. However, Mr. Kern's report is not inconsistent with Mr. Heroy's reports that the critical path portion of the installation of the main roof glass activity ended on either April 27 or May 1, as reflected on Resp. Exh. 61 and Resp. Exh. 62, respectively.

While Mr. Heroy was unable to identify the critical path for the remainder of the contract, Resp. Exh. 61, Mr. Kern found, and we accept, that the critical path then moved to the catwalk/walkway electrical activities that were to be performed by Judd. App. Exh. 92 at 3; H.Tr., Kern, 21:206. These critical path activities included "R.I./Pull/Conn Ctwlk Power/Etc." and "R.I./Pull/Conn. Walkway Ltg." Resp. Exh. 53. According to the approved baseline schedule, these critical path activities had been scheduled to commence on March 6, 2000 and be completed by May 29, 2000, when the critical path moved to other Judd electrical activities involving the installation of lighting and fixtures on the first floor. *Id.* According to Mr. Kern, the as-built critical path portion of these catwalk electrical installation activities continued until June 18, 2001, when the critical path moved to the remaining work activities necessary to substantially complete the contract.<sup>182</sup> App. Exh. 92 at 3, 25.

Clark's approved baseline CPM schedule indicated that the remaining critical path activities, after the catwalk electrical activities were completed, to the end of the contract were "RI/Pull/Conn 1<sup>st</sup> Flr Ltg.," "Install 1<sup>st</sup> Flr. Fixtures," "Install Temp/RH Sensors," start-up/testing, installation of the plants, and punch list, and that these activities were scheduled to commence on June 20, 2000 and be completed by September 5, 2000. Resp. Exh. 53. While the record contains no documentary evidence of the as-built critical path for the remainder of the contract after the critical path portion of the catwalk electrical work had been completed, Mr. Kern recalled that the critical path then moved to the Judd's Palm House electrical work, startup/testing, installation of the plants and punch list. H.Tr., Kern, 21:206-07. We see no reason not to accept Mr. Kern's recollection in this regard, in the absence of any suggestion that the as-built critical path for this period was different from the as-planned schedule.

Since there were 421 days of total delay in the contract by the end of Period 4, and the contract was substantially complete on August 31, 2001, 360 days after the September 5 contract completion date, the total contract delay was mitigated during this period by 61 days.

## 2. Comparison of Experts' Testimony

As noted, we have used the same windows analysis for this period, as did Mr. Kern. AOC argues that Mr. Kern's windows analysis for this period is flawed because Mr. Kern (1) did not use a contemporaneous schedule to analyze this period, (2) did not rebaseline the critical path work to determine if the activities on the baseline schedule were still valid and realistic in light of the previous contract delay, and (3) did not account for work, which had been scheduled at the end of the contract that may have been done in earlier periods. Resp. PFF, part 1, § 1.A.2, at 3; Resp. Reply Brief, part 1, § 1.B at 1-2.

We agree with AOC that it is logical to assume that a contributing reason that Clark may have been able to mitigate the delay by 61 days during this period was that work otherwise planned during this period had been resequenced and performed earlier while the repairs to the Palm House aluminum structure were being done. *See* H.Tr., Sullivan, 13:121-24; Kern, 21:204-05. It is also true that Mr. Kern's analysis was not supported by contemporaneous scheduling

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<sup>182</sup> Although no longer on the critical path, work on the catwalk electrical work activities continued until June 29, 2001. App. Exh. 92 at 3.

documentation that is in the record and that he did not rebaseline the activities scheduled in this period.

Nevertheless, we agree with the logic of Mr. Kern's windows analysis that the contract delay was in fact mitigated during this period by 61 days. As discussed above, we have accepted the logic of the windows analysis advanced by both parties' experts in assessing the delay under this contract based upon a comparison of the as-planned and as-built CPM schedules. Having adopted this approach for the first four windows periods, we find that it is appropriate, for consistency's sake, to use the same windows logic in analyzing how the completion of the work activities during this last period affected the delay under the contract. Thus, even accepting that some activities planned for this period had been done earlier and that there is no documentary evidence of the critical path in this period, the fact is that Clark was able to mitigate the delay by 61 days during this period, which resulted in a 360-day total contract delay, instead of the 421-day delay extant at the end of Period 4.<sup>183</sup>

While we see no reason to disagree with the logic of Mr. Kern's windows analysis of this period, showing 61 days of mitigation of the contract delay, we do not agree with his conclusion that Clark has therefore shown that this mitigation of delay was solely caused by Clark's acceleration. App. Exh. 92 at 25. As noted above, given the absence of any evidence to the contrary, it seems logical to conclude that this mitigation of the delay may have been affected by resequencing of the work activities, so that some of the work originally scheduled for this period was done in earlier periods, particularly in the absence of any evidence to the contrary.

More importantly, however, Clark's entitlement to acceleration damages for this or any other period is not based on the results of this windows analysis, which serves merely as the means to determine the relative responsibility of the parties for the 360 days of delay in completing this contract. Instead, as discussed below, the entitlement to acceleration damages is based upon whether AOC either actually or constructively accelerated the contract performance. Thus, the results of the windows analysis of Period 5 do not establish entitlement to acceleration damages, but are merely a means for assessing the parties' relative responsibility for delay under the contract.<sup>184</sup>

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<sup>183</sup> It is true that Mr. Kern found this delay was mitigated by 61 calendar days whereas Mr. Heroy found it was only mitigated by 22 work days (approximately 31 calendar days). App. Exh. 92 at 25; Resp. Exh. 61. Nevertheless, if Mr. Heroy's erroneous belief that substantial completion did not occur until a month later than August 31 and the other differences in his methodology in analyzing delay in his last windows period are accounted for, the experts' conclusions concerning the mitigation of the delay during this period are basically consistent.

<sup>184</sup> Thus, given the limited purpose of this windows analysis, there is no need for Mr. Kern to rebaseline the activities in this period. As explained by Mr. Kern, because the critical path work was done basically in the same sequence as was planned, the CPM updates did not have to be used in the CPM analysis because the CPM did not have to be "rebaselin[ed]." H.Tr., Kern, 21:38. In fact, we note that Mr. Heroy did not rebaseline activities in this period, or testify that this needed to be done, as part of his windows analysis.

### 3. Period 5 Conclusion

Based on our review, we find that the total delay was mitigated by 61 calendar days during Period 5, such that the total contract delay was 360 calendar days.

#### F. Summary of Total Critical Path Delay

Based on the foregoing, we find that the contract was delayed by 360 calendar days. We found that as of April 10, when the installation of the main roof glass activity commenced, there was a total delay of 421 calendar days: 130 days in Period 1, 144 days in Period 2, 39 days in Period 3, and 108 days Period 4. From that time, this delay was mitigated by 61 days by the time the contract was substantially completed on August 31, 2001, such that the total contract delay was 360 calendar days. We found that of the 421 total days of delay, Clark was responsible for a total of 298.6 days of delay (114 days for the Period 1, 144 days for Period 2, 37.6 days for Period 3, and 3 days for Period 4), AOC was responsible for a total of 120.4 days of delay (16 days for Period 1, 1.4 days for Period 3, and 103 days for Period 4) and there were 2 concurrently caused, but excusable, days of delay in Period 4.

Where both the contractor and the agency contribute to a period of delay, the contractor cannot recover delay damages, unless the record established a clear apportionment of the delay and expenses attributable to each party. *T. Brown Constructors, Inc. v. Pena* 132 F.3d at 734-35. Here, there is a logical, reasonable means of apportioning the allowable delay damages based upon extended contract performance of Clark and its subcontractors, given that we have found that AOC was solely responsible for 120.4 days of the 421 days of total delay. We thus find that Clark and its subcontractors are entitled to 120.4/421 of their otherwise allowable delay damages that are based upon extended contract performance.<sup>185</sup>

We note that the amount of compensable delay to which we found Clark entitled is significantly less than the 207 days of delay that AOC granted Clark in a contract extension on September 11, 2000. Resp. Exh. 94. However, this contract extension does not mean that Clark is entitled to compensation for that delay. Where the government refrains from exercising its right to collect liquidated damages by extending the time of performance, though that forbearance may tend to raise some question of government-caused delay, it is not tantamount to an admission that the delay was government-caused delay and therefore compensable. *J.D. Hedin Constr. Co., Inc. v. United States*, 171 Ct. Cl. 70, 83, 347 F.2d 235 (1965); *Robert E. Lee & Co., Inc. v. United States*, 164 Ct. Cl. 365, 369 (1964); *Wilner v. United States*, 26 Cl. Ct. at 277. As was observed by the Court of Claims, "when a contracting officer decides not to charge a contractor with liquidated damages for his delay different standards may be employed than those which are used

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<sup>185</sup> As discussed above, AOC is not liable for delay damages for the 2 concurrent days of delay. *T. Brown Constructors, Inc. v. Pena* 132 F.3d at 734-35. We also note that even assuming that AOC's design defects also contributed to those days of delay for which we find Clark responsible, this would not entitle Clark to delay damages for those days of delay. This is so because such an additional cause would make those days of delay concurrent and Clark has not met its burden of showing the government was sole proximate cause of those days of delay. *Hoffman Constr. Co., of Oregon v. United States*, 49 Fed. Cl. at 198.

by courts in determining whether or not a contract has been breached to the contractor's injury," *Robert E. Lee & Co., Inc. v. United States*, 164 Ct. Cl. at 368, and such a contract extension "could well mean that the parties' hopes had outrun reality, rather than that the defendant had acted improperly [and that] [r]ecognizing the delays as the cause of the extensions would free the plaintiff of the threat of liquidated damages, but it would not, in itself, prove that the delay was wrongful." *Commerce Int'l Co., Inc. v. United States*, 167 Ct. Cl. at 539. There is no suggestion in the record that AOC was conceding any liability for delay damages in granting the contract extension it granted; to the contrary, AOC specifically noted in granting this extension that the "determination of any compensation associated with the above time extension will be the subject of future discussions and correspondence." Resp. Exh. 94.

We also note that Clark has introduced evidence as to the number of RFIs issues on this project, and indicated that they were excessive and contributed to Clark's delay damages. H.Tr., Dylus, 22:124-28; App. Exh. 98. However, as indicated above, the causal link for delay for extended term damages must be established by a CPM analysis that establishes that there was delay in the critical path activities that extended the term of the contract; the number of RFIs and changes are not themselves sufficient to establish the Government's liability for a contractor's delay or inefficiency. See *Hensel Phelps Constr. Co., supra*, at 150,795.

Clark also references AOC's April 3, 2000 letter to the Chairman of the Subcommittee on the Legislative Committee on Appropriations of the House of Representatives wherein AOC advised that many design drawings were seriously flawed and that as a result Clark had put AOC on notice that it intended to pursue claims for additional money and time, C4 Supp. 10 0369-70, and argues that this letter is an admission of liability for delay damages by AOC. Contrary to Clark's argument, this letter, sent before AOC had the opportunity to complete its investigation of Clark's claims, expressly advises the Chairman that AOC intends to "vigorously defend the government's rights on these issues." *Id.*

#### **V. NON-CRITICAL PATH DELAY**

Contrary to Respondent's arguments, delay damages can be recovered in appropriate circumstances, pursuant to the Changes or Suspension of Work clause, for delays in work that is not on the critical path or is not based upon the extended term of the contract. See *Paul Hardeman, Inc. v. United States*, 186 Ct. Cl. at 749 (1969); *Avedon Corp. v. United States*, 15 Cl. Ct. 648, 652-53 (1988); *American Int'l Contractors, Inc./Capitol Indus. Constr. Groups, Inc., A Joint Venture*, ASBCA Nos. 39544 *et al.*, August 31, 1995, 95-2 BCA ¶ 27,920 at 139,337-38; *Preston-Brady Co., Inc.*, *supra*, at 99,490; see also *E.R. Mitchell Constr. Co. v. Danzig*, 175 F.3d 1369, 1373 (Fed. Cir. 1999) (subcontractor's Eichleay damages caused by defective specifications causing the extended performance of the subcontract can be recovered in appropriate circumstances, even though prime contract was not delayed). The primary circumstance for allowing the recovery of these type of delay damages is that the claimed damages not be based upon an extended prime contract term (because then there is no recovery unless it has been shown that the contract performance term was extended), but be for impact or disruption costs caused by a particular action causing delay in an aspect of the contract that amounts to a constructive change or suspension to the contract by the government. *Cibinic & Nash, Administration of Government Contracts*, at 723-24.

Here too, the “essential burden of establishing the fundamental facts of liability, causation and resultant injury” rests on the contractor. *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199; *Dawson Constr. Co., Inc., supra*, at 130,321. Indeed, except for the requirement that the overall contract period be extended, many of the above-discussed rules applicable to critical path delay damages are also applicable to non-critical path delay damages.

For example, such delay damages are not recoverable where the causes for the claimed delay are concurrent. *See Avedon Corp.*, 15 Cl. Ct. at 652-53, 657. Since the presence of concurrent delay can foreclose the recovery of non-critical path delay damages, a CPM schedule analysis may be required to determine whether such damages are recoverable. In this regard, since AOC has privity of contract with Clark, not its subcontractors, it may be that even where a subcontractor’s work is delayed by AOC’s actions, its recovery of delay damages may be foreclosed if there was concurrently caused delay by Clark or one of Clark’s other subcontractors that would have delayed the subcontractor’s performance in any case. *Id.*; *see Commerce Int’l Co., Inc.*, 167 Ct. Cl. at 545.

Because the non-critical path delay claims here are based upon their particular circumstances, they will be separately addressed for each subcontractor below. However, we note that many of the subcontractors’ non-critical path delay claims in this appeal are unsupported by any CPM or scheduling evidence, much less expert testimony, concerning how other delays under the contract, for example, the delays on the critical path, may have affected these claimed delays. Although the parties have provided the Board with portions of the as-planned baseline schedule identifying the planned sequencing and duration project activities, they have not provided, in any intelligible form, updates to this schedule (except some updates concerning the critical path) or other as-built scheduling information showing the relation of non-critical path activities to the overall schedule. Thus, the Board has had to make its own judgments based upon the limited information in the record in determining whether there was concurrent delay that affected claimed non-critical path delay.

## **VI. LIQUIDATED DAMAGES**

The contract, as amended, contained a liquidated damages provision, which stated in pertinent part:

If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of [\$1,190] for each calendar day of delay.

R4, K0055. Contract extensions are governed by the provisions of the Default clause, FAR § 52.249-10 (April 1984), incorporated by reference into this contract, R4, K0052, which provides for contract extensions for delay arising from unforeseeable causes beyond the control and without the fault or negligence of the contractor. Here, as discussed above, the contract

completion date was September 5, 2000, R4, K0054, and the contract was not substantially complete until August 31, 2001, 360 calendar days later.<sup>186</sup>

In the contracting officer's decision, \$178,500 in liquidated damages were assessed Clark for 150 days of inexcusable delay. COD, part 5, at 2. In determining the amount of inexcusable delay, the decision credited Clark with the 207-calendar-day contract extension from September 5, 2000 to March 31, 2001, which had been granted Clark by AOC on September 11, 2000.<sup>187</sup> See Resp. Exh. 94. The decision also granted Clark a 34-day contract extension for the remedial work associated with performing necessary repairs to the Palm House during Period 4 (discussed above). Moreover, the contracting officer determined that the contract work was not substantially complete until September 30, 2001. COD, part 5, at 2. Thus, while it does not specifically say so, the contracting officer's decision essentially found that the contract was delayed by 391 days (from September 5, 2000 to September 30, 2001), and that Clark was authorized time extensions totaling 241 days (207 + 34), so that an assessment of liquidated damages for 150 days was warranted. Although these damages were assessed in the contracting officer's decision, this amount has not been billed or paid by Clark.

In its appeal, Clark only generally challenges this assessment, although Clark does assert that virtually all of the delay in completing this contract was caused by AOC.<sup>188</sup> C4 Supp. 08 00005. Thus, we will consider the amount of the liquidated damages that should be assessed because of the late completion of the contract.<sup>189</sup>

When a contractor seeks remission of liquidated damages, it has the burden of showing the extent of the delay and that the delay was the result of unforeseeable causes beyond the control and without the fault or negligence of the contractor, such as government-caused delay.

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<sup>186</sup> Liquidated damages cannot be assessed after the date on which the contract work is substantially complete. Cibinic & Nash, Administration of Government Contracts, at 1061.

<sup>187</sup> The contracting officer's decision erroneously states that this extension was granted on or about April 6, 2000. COD, part 5, at 1.

<sup>188</sup> With regard to AOC's assessment of liquidated damages, Clark only complains in its appeal that this decision was "not factually supportable, equitable or appropriate as a matter of law." C4 Supp. 08 00005.

<sup>189</sup> We find two immediate problems with AOC's assessment of liquidated damages here. First, as noted, the contracting officer's decision was based upon a substantial completion date of September 30, 2001. However, as AOC now concedes, substantial completion actually occurred on August 31, 2001--30 days earlier. We also note that AOC's assessment of liquidated damages was erroneously predicated upon the assumption that the contract was delayed 391 calendar days. This assumption was apparently based upon the report of Mr. Heroy, where he calculated the delay based upon the substantial completion date of September 30, 2001 as 391 calendar days. COD, app. B, at 2. Our review indicates that the period from September 5, 2000 (the contract completion date) to September 30, 2001 is actually 390 days. This misapprehension by the contracting officer resulted in an overassessment of liquidated damages of 1 day. That is, since the contracting officer's decision recognized that 241 days of the delay were excusable (207 + 34), he should have only assessed 149 days in liquidated damages (390 - 241) under the logic employed.

*Sauer Inc. v. Danzig*, 224 F.3d at 1345; see *Donohoe Constr. Co.*, ASBCA Nos. 47310, 47312, May 13, 1999, 99-1 BCA ¶ 30,387 at 150,190.

As noted, AOC essentially conceded in the contracting officer's decision that it could not assess liquidated damages for the 207-day contract extension period to March 31, 2001. Indeed, we agree that AOC is bound by this contract extension, with regard to the assessment of liquidated damages, even though our review indicated that Clark was actually responsible for the bulk of the delay incurred prior to September 11, 2000 and that AOC was responsible for far less of the total 207 days of excusable delay granted.<sup>190</sup> See *J.D. Hedin Constr. Co., Inc. v. United States*, 171 Ct. Cl. at 83; *Pathman Constr. Co. v. United States*, 227 Ct. Cl. at 675. Because the amount of time granted by this contract extension exceeded the amount of excusable delay, we find this extension accounts for all excusable delay incurred prior to September 11 for purposes of determining the amount of liquidated damages that should be assessed.

However, it is apparent that the contract extension granted by AOC on September 11, 2000 could not account for excusable delay incurred by causes occurring after that date, and that subsequent excusable delay that caused the contract to be extended beyond March 31, 2001 needs to be accounted for to determine the amount of liquidated damages that should be assessed. In this regard, the contracting officer's decision already accounted for 34 days of such excusable delay in determining how many days of liquidated damages should be assessed.

As indicated above, the contract was substantially complete on August 31, 2001 for a total 360-day delay beyond the original September 5, 2000 contract completion date. We also found that AOC was responsible for 103 days of delay, and that there were 2 days of concurrent delay, a total 105 days of excusable delay, during Period 4, which represents the total excusable delay incurred by causes occurring after AOC's September 11 207-day contract extension. Thus, Clark is liable for 48 days (360 - 105 - 207) of liquidated damages at the daily rate of \$1,190 for a total \$57,120 in liquidated damages. We will subtract this amount from the total amount awarded Clark below.

## **VII. ACCELERATION DAMAGES**

Clark argues that it and its subcontractors are entitled to recover costs for accelerating their work. The genesis of this claim arose from meetings that AOC had with Clark beginning in December 1999 and continuing in January 2000, where the parties recognized that the project was well behind schedule and met to ascertain how these problems could be addressed, with the goal of accomplishing something tangible in the construction of the Botanic Garden by September 5, 2000.<sup>191</sup> H.Tr., Sullivan, 13:47-53. The record indicates that it was not just the critical path Palm House work that was significantly lagging behind schedule but other areas of the project as well, and these meetings discussed how progress on all areas of the project could be improved.

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<sup>190</sup> As indicated above, however, this contract extension did not bind AOC to pay Clark's delay damages claim. *J.D. Hedin Constr. Co., Inc. v. United States*, 171 Ct. Cl. at 83; *Robert E. Lee & Co., Inc. v. United States*, 164 Ct. Cl. at 369; *Wilner v. United States*, 26 Ct. Cl. at 277.

<sup>191</sup> The record shows that AOC and Clark previously explored the possibility of accelerating the work in the Summer of 1999, C4 Supp. 21 1735, but AOC elected not to order acceleration. C4 Supp. 21 1858.

According to Clark, it then began developing recovery schedules, first labeled DC-99 and later labeled BGR, which it started providing AOC as early as January 2000. These schedules indicated that Clark could complete the project by May 2001, if it accelerated its work. *See* H.Tr., Sullivan, 13:56-60; C4 Supp. 22 0395. Clark also provided AOC with "order of magnitude" costs to achieve these recovery schedules. *See* C4 Supp. 22 0345, 22 0395.

On February 25, Mr. Hantman, advised Clark that he could not justify the order of magnitude costs proposed by Clark for allowing certain portions of the building to be occupied by September 5, but he was interested in a plan that would allow for use of the entire facility, except the Palm House, by December 30, 2000, with the Palm House to be completed by March 15, 2000. Mr. Hantman "request[ed]" a schedule for this scenario with a justification for any proposed additional costs. R4, LTR 1577-79.

Meanwhile, on January 10 and February 14, 2000, Clark had submitted several requests for time extensions and associated "money" for 232 and 226 work days, respectively. The February 14 letter stated that the "realistic" completion date for the contract should be extended to July 19, 2001. Clark requested an immediate contract modification extending the contract term. These requests for time extension were "due to structural steel (sic, Clark obviously meant structural aluminum) design deficiencies at the Palm House." The only structural aluminum issues mentioned as being problems in these letters (with supporting fragnets) requesting time extensions were (1) an incomplete transition house design, (2) an incomplete design of the Palm House cricket areas at the north end, (3) an incomplete design of the Palm House south end vestibule area, and (4) an incomplete design of the Palm House/Garden Court expansion joint.<sup>192</sup> These were Clark's first requests for time extensions to AOC based upon the structural aluminum design deficiencies.<sup>193</sup> R4, LTR 5559; R4, LTR 5585.

AOC did not immediately respond to these requests, but on April 6, 2000, after further discussions with Clark and based on AOC's review and reliance upon Clark's DC99 and BGR schedules, Mr. Hantman "directed" that all areas of the project, except the Palm House, be made suitable for provisional use by December 30, 2000 and stated that it "appear[ed]" to AOC that the rest of the contract work would be completed no later than March 31, 2001. This letter stated, "once the detailed cost breakdowns and supporting documentation for the full extent of all areas of your request for equitable adjustment are received, we will work with you to issue any appropriate contract modification, as expeditiously as possible." C4 Supp. 22 1711-12. This letter did not expressly authorize or direct the acceleration of the contract work.

On July 6, Clark requested a 277-work day extension. In this letter and the attached fragnet, Clark cited the same four structural aluminum design defects in support of its delay claim. C4 Supp. 22 2727-28. On that same day, Clark also requested a 216 working day extension because of AOC's revisions to the Palm House maintenance levels 3 and 4 catwalks. C4 Supp.

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<sup>192</sup> As discussed above, the issues concerning these four design defects first surfaced at a September 21, 1999 meeting. C4 Supp. 21 2280.

<sup>193</sup> Clark's earlier request for time extension was based upon issues relating to Rough's glazing system, which, as indicated above, was not on the as-built critical path. R4, LTR 4454 (Clark Letter to AOC requesting 73 work day extension (May 13, 1999)).

22 2732. On July 20, 2000, AOC denied Clark's request for a 277-day time extension in a letter stating:

Attachment No. 4 to Amendment No. 9 requires you to provide the necessary design work associated with the conservatory system. The issues you have raised fall under this section of your contract.

Therefore, your request for a time extension is denied. You should proceed to prosecute the completion of the work in accordance with our letter of April 6, 2000.

R4, LTR 2356.<sup>194</sup>

However, as discussed above, by Change Order No. 132, dated September 11, 2000, AOC granted a contract time extension to Clark for "[a]ll areas of the project, except the Palm House, . . . to be complete for provisional use by December 30, 2000, [and] [a]ll contract work . . . be completed by March 31, 2001." Resp. Exh. 94. Thus, AOC granted Clark a 207-calendar day contract extension from September 5, 2000 to March 31, 2001, App. Exh. 92 at 28, but AOC did not determine that this delay was compensable.<sup>195</sup>

Except for limited acceleration orders issued on February 10, 2000 by AOC to Clark (1) authorizing overtime and extended hours for the structural aluminum fabrication work by Standard Iron not to exceed \$40,000, C4 Supp. 22 0546 (discussed as part of Standard Iron's acceleration claim) and (2) authorizing overtime for Kalos' work in installing the primary air duct in the low houses not to exceed \$25,000, R4, COF 2804 (discussed as part of Kalos' acceleration claim), we have found no specific order by AOC that Clark accelerate the contract work; nor has Clark pointed to any such order.

In its post-hearing brief, Clark states that the April 6, 2000 letter requiring that work be completed by March 31, 2001 and AOC's denial on July 20, 2000 of Clark's request for time extension were considered by Clark to be constructive orders to accelerate the contract work.<sup>196</sup> Clark contends that this was so because, while AOC was demanding contract completion by March 31, 2001, AOC had not acted upon, and subsequently denied (on July 20, 2000), Clark's requests for time extensions, including Clark's last requested 277 working-day time extension. This was significant because the contract was required to be completed by September 5, 2000

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<sup>194</sup> We have not found in the record AOC's response to the time extension request related to the catwalks, and we presume that it was considered denied since neither party argues otherwise.

<sup>195</sup> The record does not indicate why AOC changed its position with regard to extending the contract term. See D.Tr., Metzler, 78-79.

<sup>196</sup> Elsewhere, Clark suggests that the December 1999 meetings, which led to Clark's development of the DC-99 and BGR schedules showing acceleration and AOC's February 25 letter, constituted constructive acceleration orders. However, the record shows that these actions were merely AOC's gathering of information and discussing alternatives with Clark in deciding how to improve the progress of the project, including deciding whether acceleration of the project was appropriate.

and the contract contained a liquidated damages provision, R4, K0055, and no time extensions had been granted by AOC in response to Clark's time extension requests, even though Clark's updated schedules at that time projected a "realistic" August 2001 completion date. In response to the April 6, 2000 AOC letter, Clark and its subcontractors did in fact take actions to accelerate their work beginning in the Spring of 2000, which actions continued until the project was completed on August 31, 2001. Appellant's PFF ¶¶ 200, 202-05, 207, 259-60, 263-64. In determining whether a constructive acceleration has occurred, the following factors must be addressed:

1. Existence of one or more excusable delays;
2. Notice by the contractor to the Government of the excusable delay, and a request for a time extension or knowledge by Government of the excusable delay;
3. Failure or refusal by the Government to grant the requested extension;
4. An express or implied order by the Government to accelerate with notice by the contractor that this "order" is considered to be a constructive change; and
5. Reasonable efforts by the contractor to accelerate resulting in increased costs.

*Hemphill Contracting Co., Inc.*, ENGBCA Nos. 5698 *et al.*, November 12, 1993, 94-1 BCA ¶ 26,491 at 131,853; *Norair Eng'g Corp.*, 229 Ct. Cl. 160, 164-67, 666 F.2d 546 (1981); *Fru-Con Constr. Corp.*, 43 Fed. Cl. at 328; *v. United States*, 129 F.3d 136, 1997 U.S. App. LEXIS 29365 (Fed. Cir. 1997) (unpublished); *Cibinic & Nash, Administration of Government Contracts*, at 451. It is Appellant's burden to prove the existence of all of the elements necessary for a compensable acceleration. *Gavosto Assocs.*, PSBCA Nos. 4058 *et al.*, April 25, 2001, 01-1 BCA ¶ 31,389 at 155,047.

Here, some of the elements of a constructive acceleration are present. AOC did not timely respond to Clark's requests for time extensions, which were based on asserted excusable delay, and then directed that work be completed by March 31, 2001, even though Clark's requests for time extensions, if granted, would have extended the contract completion date to August 2001. In addition, on April 13, 2000, Clark advised AOC that it considered the April 6 letter to be an authorization to accelerate its work,<sup>197</sup> C4 Supp. 10 0284, and continued submitting its BGR schedule updates that indicated that the project was being accelerated.<sup>198</sup> C4 Supp. 22 1731. The record also contains evidence that Clark and its subcontractors took some actions to accelerate their performance from April 2000 to the completion of the contract, *see, e.g.*, R4,

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<sup>197</sup> On April 28, 2000, AOC promptly advised Clark that its April 6 letter was not a directive to accelerate. C4 Supp. 10 0283.

<sup>198</sup> We understand that Clark managed the rest of the project using the BGR schedules, updates of which it submitted to AOC on a monthly basis. Clark asserts that AOC's failure to repudiate these BGR schedules until the February 5, 2001 cure notice shows that AOC acknowledged and accepted responsibility for the Clark acceleration from April 2000. However, as indicated above, these schedules were not accepted by AOC. In fact, the contract contemplated that AOC would formally accept CPM schedules in order for them to have legal significance.

5657-5672, although it also contains evidence that AOC believed that the project was not being adequately staffed, much less accelerated, during this period. App. Exh. 52, attach 1 at 1; attach. 1a.

The April 6 letter cannot qualify as a constructive acceleration order because, as we found above, there was no excusable delay for any of the reasons advanced by Clark in its requests for contract extension. Indeed, Clark was not entitled to excusable delay for any of the reasons advanced in its requests for time extension (the four specific alleged design defects or the catwalk change issue).<sup>199</sup> Moreover, as of April 6, 2000, we found there were only 16 calendar days of excusable delay, far less than the 316 to 388-calendar day requests for contract extension that had been requested by Clark<sup>200</sup> and the 207 calendar days of excusable delay recognized in AOC's September 11, 2000 contract extension. Under the circumstances, we find that AOC's April 6 letter cannot be considered a constructive acceleration order because the excusable delay requested by Clark was not valid.<sup>201</sup> See *Fraser Constr. Co. v. United States*, 57 Fed. Cl. 56, 62-63 (2003); *Carney Gen. Contractors, Inc.*, NASABCA Nos. 375-4, 875-7, May 8, 1979, 79-1 BCA ¶ 13,855, at 67,977.

Clark also alleges that the agency's February 5, 2001 cure notice to Clark also constituted a constructive acceleration order. As indicated above, the cure notice letter made five basic points: (1) "Clark has failed to make adequate progress under the terms of the contract so as to endanger its timely performance"; (2) "Clark has ignored the [CPM] contract requirements"; (3) there are "structural problems"; (4) "Clark has not followed the mandatory procedures . . . for making changes to the contract"; and (5) "Clark is systematically ignoring the required 'submittal' process[; that is, it] has repeatedly failed to make submittals in a timely and coordinated manner, thereby increasing the risk that the work will have to be removed and replaced, potentially further delaying the project." AOC requested that Clark respond separately to each deficiency item and describe with specificity what Clark intended to do to cure each deficiency and to perform the remaining work in a timely fashion; AOC indicated that unless a satisfactory response was received the contract may be terminated for default. App. Exh. 52.

We think this letter satisfies the requirements of a constructive acceleration. The context in which this notice was sent to Clark was unfortunate from AOC's standpoint. That is, as discussed above, the work in the Palm House, which was the critical path, had to be suspended

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<sup>199</sup> The contracting officer's decision noted that Clark's requests for time extension at that time were limited to the four design issues. COD, ch. 3, at 22.

<sup>200</sup> Clark requested a 226 work day extension (approximately 316 calendar days), which it subsequently amended to 277 work days (approximately 388 calendar days). R4, LTR 5585; C4 Supp. 22 2727.

<sup>201</sup> In any case, even assuming that the April 6, 2000 direction was considered a constructive acceleration order, Clark's entitlement to acceleration costs would have stopped as of September 11, 2000, when AOC granted a time extension for a period which greatly exceeded that to which Clark was entitled. See *William Lagnion*, ENGBCA No.3778, May 25, 1978, 78-2 BCA ¶ 13,260 at 64,842 (acceleration costs denied for period after which government removed cause for acceleration (threats of default) by recognizing excusable delays, where the remaining acceleration was to address delays for which the government was not responsible.)

for a significant period because of a DMJM design defect.<sup>202</sup> Thus, while it appears that AOC may have made legitimate points in its cure notice concerning Clark's failure to diligently pursue the work or to follow the required change and submittal procedures, the fact is that Clark threatened to default Clark's contract in the midst of a delay period, not caused by Clark but caused by an admitted design defect for which AOC was responsible. As discussed above, AOC was promptly apprised of the discovery and nature of this design defect and the steps that Clark was taking to address it, *see, e.g.*, R4, COF 972-80, 1008, 1051, 1071, and concurred in the reasonableness of Clark's suspending performance on the critical path Palm House glazing system installation activities until this design issue was corrected, *see* COD, ch. 3, at 14, yet it contemporaneously threatened Clark with default for failing to timely complete the contract. Under the circumstances, Clark was entitled to regard the cure notice as a direction to accelerate its performance. *See Granite Constr. Co., v. United States*, 24 Cl. Ct. 735, 754 (1991); *Intersea Research Corp.*, IBCA No. 1675, April 25, 1985, 85-2 BCA ¶ 18,058 at 90,630-31.

We considered two possible impediments to considering the cure notice to be a constructive acceleration. First is the fact that Clark claimed that it was already supposedly accelerating its work when it received the February 5 cure notice. At least one Board has denied a claim for constructive acceleration where the contractor had already accelerated its performance prior to the alleged constructive notice to accelerate because that evidenced that the order was not the cause for the acceleration. *See Solar Foam Insulation*, ASBCA No. 46278, August 6, 1993, 94-1 BCA ¶ 26,288 at 130,775. However, Brian Dylus, Clark's project executive, testified that although Clark had previously accelerated its work in response to the April 2000 constructive acceleration, H.Tr., Dylus, 22:106-07, this letter caused Clark to "further accelerate" the project to complete it by August 31, 2001.<sup>203</sup> *Id.* at 22:114. The record also shows that Clark and its subcontractors did in fact accelerate the project from the date of the cure notice. H.Tr., Sullivan, 13:81-88; Kern, 21:99; Dylus, 22:116-24; App. Exh. 97.

The other impediment that we have considered is that as of the time that this letter was written, AOC had already granted Clark significantly more excusable delay in the form of the 207 day contract extension than the total 122.4 days of excusable delay that Clark was ultimately entitled to receive by the time the contract was substantially complete. However, given that Clark was still pursuing its claim for a substantially longer excusable delay, the fact that the cure notice was issued while the project was being legitimately suspended because of the lacing angle design defect, and the fact that the cure notice did not take into account or even acknowledge this suspension but instead threatened default, we think that the fact that Clark had already been granted more excusable delay than it was entitled to receive does not preclude the February 5, 2001 letter from being considered a constructive acceleration. Under the circumstances, we consider the February 5, 2001 cure notice to be a constructive notice to accelerate.

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<sup>202</sup> Mr. Sullivan testified that Clark was on schedule to complete the project by May 30, 2001, as indicated on the BGR schedules, until the work stoppage because of the defective lacing angle. H.Tr., Sullivan, 13:80-81.

<sup>203</sup> In any case, the record shows that AOC did not believe that Clark had previously accelerated its work in any case. App. Exh. 52, attach. 1 at 1; attach. 1a.

However, as indicated above, where a contractor's performance is delayed by multiple causes acting concurrently, and only some causes are excusable, *i.e.*, where other causes lie with the contractor, courts and boards have adopted the approach that neither party will benefit from the delay. Consequently, in a "Changes" clause analysis, as here, a contractor cannot recover acceleration costs flowing from a concurrent delay, unless the record supports a clear apportionment of the delay and expense attributable to each party. *R.J. Lauthier Co., Inc.*, ASBCA No. 51636, December 9, 2003, 04-1 BCA ¶ 32,481 at 160,669; *Hemphill Contracting Co., supra*, at 131,853.

Here, based on our CPM analysis, we are able to apportion the causes of the delay to determine which proportion of the delay was excusable. In this regard, we find that there are excusable causes for 122.4 days of the 421 days of total delay.<sup>204</sup> Thus, we find that Clark and its subcontractors are entitled to recover 122.4/421 of their otherwise allowable acceleration costs incurred during the constructive acceleration period from February 5, 2001 to August 31, 2001 flowing from the concurrently caused contract delay. We also find that the accelerated work during this time frame need not be on the critical path to be compensable acceleration; the record shows that all aspects of the project needed to be accelerated in order for the contract to be substantially complete by August 31.<sup>205</sup>

#### **VIII. CLARK'S SUBMITTED CLAIM**

Clark's revised claim, in the amount of \$12,406,250, is structured as follows.<sup>206</sup>

Current Contract Value	\$30,026,553
Credit for Originally Anticipated Profit <sup>207</sup>	<\$788,717>
Credit for Mark-Up on Approved Changes	<\$210,603>
<b>Subtotal (Cost in Current Contract)</b>	<b>\$29,027,233</b>
<b>Claims/ Costs</b>	
Clark Excess General Conditions Costs	\$1,360,862
Clark Excess Design Costs	\$114,048
Clark Excess Scheduling Consultant Costs	\$257,571

<sup>204</sup> AOC was responsible for 120.4 days of delay and there were 2 days of concurrent delay, all of which constituted excusable delay.

<sup>205</sup> AOC also asserts that Clark should not be reimbursed any of its claimed acceleration costs because it did not provide scheduling evidence concerning the base line and duration of the accelerated activities. We find such evidence to be unnecessary in view of our finding that AOC constructively accelerated the contract work on February 5, 2001.

<sup>206</sup> As indicated, Clark revised its claim on multiple occasions during the hearing.

<sup>207</sup> While Clark uses the terms of "fee" and "profit" interchangeably in its claim and appeal, "fee" properly refers to the amount paid to a contractor beyond allowable costs under a cost-type contract, while "profit" is the proper term when the contract, as here, is fixed-price in nature. See FAR § 15.404.4; Ralph C. Nash, Jr., Steven L. Schooner, Karen R. O'Brien, *The Government Contracts Reference Book*, 2d. ed., The George Washington University (1998).

Clark Judd Supplementation Costs	\$302,838
Clark Pending Changes	\$417,348
Clark Acceleration Costs	\$551,973
Subcontractor Pending Changes	\$2,196,673
Subcontractor Delay & Acceleration Claims	\$5,024,592
Proposal Preparation Costs	\$132,806
<b>Subtotal (Claims Costs)</b>	<b>\$10,358,711</b>
Subtotal (Contract and Claims Costs)	\$39,385,944
Clark Home Office Overhead	\$179,206
Clark Profit	\$2,595,653
<b>Subtotal (Contract and Claims Costs, Overhead and Profit)</b>	<b>\$42,160,803</b>
Paid to Date	<\$29,754,553>
<b>Total Unpaid (Claim)</b>	<b>\$12,406,250</b>

App. Exh. 139. The format of Clark's submission here requires some explanation. The claim begins with the present contract price, from which Clark subtracts the contractor's profit on original contract work and approved change orders to determine the "cost in the current contract." To this amount, Clark adds the delay, acceleration, and change order claims of both itself and its subcontractors, to reach a subtotal before overhead and profit. Clark then includes markups for its home office overhead (at a rate of 1.73 percent of the \$10,358,711 subtotal of additionally claimed costs) and profit (at a rate of 10 percent of the \$39,565,150 in total costs, less Clark's claimed excess general conditions costs). From this subtotal of costs and profit, Clark then subtracts the contract payments made to date by AOC to reach its total claimed amount.

Appellant's revised claim summarized its subcontractor's delay and acceleration claims as follows:

Subcontractor	Delay	Acceleration	Total
Clark Concrete	\$538,935	0	\$538,935
Judd	\$2,138,709	0	\$2,138,709
Kalos	0	\$48,000	\$48,000
Kirlin	\$400,835	\$577,634	\$978,469
Lorton	\$123,934	\$17,814	\$141,748
Megaco	\$18,418	\$3,909	\$22,327
Ridgeview	\$238,021	\$2,992	\$241,013
Rough Brothers	\$133,010	\$260,939	\$393,949
Standard Iron	\$210,145	\$234,481	\$444,626
TG Construction	\$40,667	\$36,149	\$76,816
<b>Total</b>	<b>\$3,842,674</b>	<b>\$1,181,918</b>	<b>\$5,024,592</b>

*Id.*, attach. 10. This summary miscategorized some of the subcontractor claims and contained errors with regard to the amounts sought. However, we consider below the claims as presented at the hearing and in the record.

Finally, Clark has submitted various claims for changes or constructive changes to its contract on behalf of itself and its various subcontractors, which is summarized as follows:

Clark	\$417,348
<b>Subcontractors</b>	
Commercial Roofing	\$5,982
Clark Concrete	\$93,137
Judd	\$77,064
Kalos	\$123,744
Kirlin	\$1,372,548
Livingston	\$8,276
Lorton	\$109,672
Megaco	\$67,953
Rentokil	\$22,300
Standard Iron	\$315,997
<b>Subcontractors Subtotal</b>	<b>\$2,196,673</b>

*Id.*, attach. 8. This summary also contained various errors as to the amounts claimed for various subcontractors and the inclusion of some change claims that are no longer part of this appeal. Some of the actually claimed subcontractor costs are also not separately listed here, but are apparently accounted for as part of Clark's or another subcontractor's change claim amount.<sup>208</sup> We have separately broken out the claimed amounts by subcontractor and have considered the actual amounts claimed by each.

Thus, Appellant's revised claim is in fact numerous, smaller claims. In resolving these claims, we will first outline the legal framework for resolving claims for equitable adjustment. We then resolve those elements of Clark's claim made on its own behalf. Next, we consider the various delay, acceleration, and change claims by subcontractor.<sup>209</sup> We then calculate the total amounts due Clark and its subcontractors for their claims, and apply the appropriate Clark markups.<sup>210</sup> To

<sup>208</sup> For example, there are four additional subcontractors whose change claims are included in this appeal, but whose names are not on the foregoing list (*i.e.*, Rough Brothers, David Allen, ARC and Truland).

<sup>209</sup> In resolving these claims, we will consider the claims as being on behalf of the subcontractor, even where Clark has already made payment and submitted its own claim, in order to properly account for Clark's markups in calculating the total amount recoverable. Thus, in resolving the claims in this section, we will generally not consider Clark's markups in the context of the particular claim.

<sup>210</sup> In determining the amount that should be recovered by Clark or its subcontractors on a particular change claim, we have taken into account those amounts by which the contract price was previously adjusted by AOC's unilateral determination on that change. However, since no payments have been made based on the contracting officer's decision, which found that the total amounts recoverable were less than the amount that AOC found Clark owed AOC because of liquidated and other damages, we do not consider the amount found allowable in that decision in determining the amounts recoverable for particular changes here.

this total, we add the amounts awarded for certain change claims for which Clark is not entitled to a further markup for reasons we discuss below. Finally, we offset the total amount otherwise recoverable with the liquidated damages due AOC and award interest.

## **IX. THE LEGAL FRAMEWORK OF EQUITABLE ADJUSTMENT CLAIMS**

A fundamental issue dividing the parties in this appeal relates to the method and the adequacy of Appellant's proof of the claimed costs. The resolution of this issue affects many cost categories in Clark's appeal. A brief overview of the relevant contract provisions and the law governing equitable adjustment claims will provide a helpful point of departure, as this was a complex case and the framework within which we must determine the validity of each element of Appellant's claim should be clarified.

The contract incorporated by reference FAR § 52.215-2, Audit and Records--Negotiation (Aug. 1996). R4, K0051. The contract also contained General Conditions Clause 21, Audits, stating in relevant part that "[i]f the price of this contract is changed through the operation of any of the provisions of this contract, the Contractor, within such reasonable time as the Contracting Officer may direct, shall submit complete and accurate cost and pricing data in support of any claim asserted under such provisions." R4, K0041.

As stated above, a contractor's entitlement to an equitable adjustment is premised upon the proof of three necessary elements: (1) liability--that the government did something that changed the contractor's costs, for which the government is legally liable; (2) causation--that there exists a causal nexus between the basis for liability and the claimed increase in costs; and (3) resultant injury. *Servidone Constr. Corp. v. United States*, 931 F.2d 860, 861 (Fed. Cir. 1991); *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199. As in other civil actions, the standard used to determine whether the burden has been met is the "preponderance of the evidence" test. *Delco Elecs. Corp. v. United States*, 17 Ct. Cl. 302, 319 (1989), *aff'd*, 909 F.2d 1495 (Fed. Cir. 1990).

The burden of proof for establishing the amount of an equitable adjustment (*i.e.*, the amount of resultant injury) also rests with the contractor when it is the party claiming the benefit of the adjustment. While courts and boards of contract appeals have recognized a variety of methods of proving the amount of the adjustment, a contractor must prove its costs using the best evidence available to it under the circumstances. *Doninger Metal Products, Corp. v. United States*, 50 Fed. Cl. 110, 125 (2001) (*citing Delco Elecs. Corp. v. United States*, 17 Ct. Cl. at 321); *see also Cibinic & Nash, Administration of Government Contracts*, at 702.

The preferred method for supporting a request for equitable adjustment is the submission of actual cost data. *Cibinic & Nash, Administration of Government Contracts*, at 703; *Delco Elecs. Corp. v. United States*, 17 Ct. Cl. at 321; *Deval Corp.*, ASBCA Nos. 47132, 47133, December 15, 1998, 99-1 BCA ¶ 30,182 at 149,325. The preference for actual cost data is reflected by the contract provisions here, which require that the contractor submit cost or pricing data that are complete, accurate and current. R4, K0041. Logically, to prove damages through the actual cost method, the contractor must provide the court or board with specific documentation of the expenses caused by the government's change. *See Dawco Constr. Co.*,

*Inc. v. United States*, 930 F.2d 872, 882 (Fed. Cir. 1991); *Reflectone, Inc. v. Dalton*, 60 F.3d 1572, 1575 (Fed. Cir. 1995); see also *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321 (“In maintaining cost data, a contractor should segregate costs associated with the change where it is feasible to do so, and especially where the contractor can anticipate submitting a large claim.”). A contractor’s unjustifiable failure to accumulate actual cost data may result in either a substantial reduction or total disallowance of the claimed costs. See *Dawco Constr. Co., Inc. v. United States*, 930 F.2d at 882. Here, only some of Clark’s and its subcontractors’ claims are supported by actual cost data.

Where actual cost data is not available, estimates of the contractor’s costs may be used to support a claim for equitable adjustment. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321; *Parsons of California*, ASBCA No. 20867, February 12, 1982, 82-1 BCA ¶ 15,659 at 77,416. Cost estimates should be prepared by competent individuals with adequate knowledge of the facts and circumstances, and the expert testimony of individuals familiar with the facts is helpful in verifying the validity of estimates. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321. Estimates should also be supported with detailed substantiating data. *Midwest Bank Note Co.*, GPOBCA No. 05-95, May 27, 1998, 1998 LEXIS 1; *Southwest Marine, Inc.*, ASBCA No. 36854, March 20, 1995, 95-1 BCA ¶ 27,601, at 137,518; *J.M.T. Machine Co.*, ASBCA Nos. 23928 *et al.*, December 19, 1984, 85-1 BCA ¶ 17,820 at 89,181, *aff’d on other grounds*, 826 F.2d 1042 (Fed. Cir. 1987). Many of the claims of Clark and its subcontractors are based upon estimated costs.<sup>211</sup>

In contrast to the actual and estimated cost methods, the “total cost” method (*i.e.*, the difference between actual expenses and bid or estimated costs) has never been favored by courts and boards of contract appeals. *Dawco Constr. Co., Inc. v. United States*, 930 F.2d at 881; *Southwest Marine, Inc.*, *supra*, at 137,518. Use of a total cost claim is tolerated only when no other means is possible and when the reliability of the supporting documentation is fully substantiated. *WRB Corp. v. United States*, 183 Ct. Cl. 409, 411 (1968). The total cost, and modified total cost, methods of assessing damages or price adjustments may be used only as a last resort in those extraordinary circumstances where no other way to compute damages is feasible. *Servidone Constr. Corp. v. United States*, 931 F.2d at 861; *ECC Int’l Corp.*, ASBCA Nos. 39044, *et al.*, January 11, 1994, 94-2 BCA ¶ 26,639 at 132,502.

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<sup>211</sup> AOC has argued that in many instances estimated costs are insufficient to allow recovery. In response, Clark has generally asserted that the “undisputed evidence was (1) that, in those instances where estimates were used, it was not possible to track actual costs, and (2) the estimates were knowledgeably prepared.” App. PFF ¶ 347. We believe a case-by-case determination is required to ascertain whether the applicable standards have been met regarding the use of estimates in support of an equitable adjustment claim. As discussed below, in some instances Clark’s subcontractors presented sufficient evidence that actual cost data was not reasonably available, and reasonably showed that the estimates were either knowledgeably-prepared or otherwise represented the reasonable value of the proposed equitable adjustment. In other instances, however, claims on behalf of subcontractors have not met the standard that would allow estimates to be used in support of equitable adjustments, for example, where the estimates have been presented with no or inadequate supporting evidence, or with no evidence that actual cost data was unavailable.

There is a very cogent reason for this judicial disfavor of the total cost method. A total cost claim "blandly assumes--that every penny of the plaintiff's costs are prima facie reasonable, that the bid was accurately and reasonably computed, and that the plaintiff is not responsible for any increases in cost." *Youngdale & Sons Constr. Co. v. United States*, 27 Fed. Cl. 516, 541 (1993). In fact, a total cost claim assumes that the contractor's entire overrun is solely the government's fault and calls upon the government to indemnify the contractor. *S.W. Electronics & Mfg. Corp. v. United States*, 228 Ct. Cl. 333, 655 F.2d 1078 (1981); *Concrete Placing Inc. v. United States*, 25 Cl. Ct. 369 (1992); *David J. Tierney, Jr., Inc.*, GSBICA Nos. 5585 *et al.*, May 3, 1988, 88-2 BCA ¶ 20,806 at 105,170. Even when a contractor's records clearly support the costs actually incurred, that does not necessarily mean that all such costs should have been incurred. Additionally, the mere incurrence of costs does not necessarily mean that the costs are the fault of the Government.

Accordingly, courts have employed a four-prong safeguard against the utilization of the total cost method, all of which must be established by the plaintiff before recovery of damages under this approach will be permitted. These are: (1) the nature of the particular cost is impossible or highly impracticable to determine with a reasonable degree of certainty; (2) the contractor's bid was realistic; (3) the contractor's actual incurred costs were reasonable; and (4) the contractor was not responsible for any of the added costs. *WRB Corp. v. United States*, 183 Ct. Cl. at 426; *Propellex Corp. v. Brownlee*, 342 F.3d 1335, 1338 (Fed. Cir. 2003); *Doninger Metal Prods. Corp. v. United States*, 50 Fed. Cl. at 125-26. If a contractor cannot prove all of the elements, or if the Government can disprove at least one of them, a contractor cannot utilize the total cost method. *Cavalier Clothes, Inc. v. United States*, 51 Fed. Cl. at 418, citing *Youngdale & Sons Constr. Co. v. United States*, Fed. Cl. at 541. Many of Clark's and its subcontractors' claims have used this disfavored method.

Irrespective of the method of proof employed, the claimant must also produce sufficient evidence that is probative of the incurrence, allocability, and allowability of its claimed costs. It is a claimant's burden to prove "the fact of loss with certainty, as well as . . . the amount of loss with sufficient certainty so that the determination of the amount of damages will be more than mere speculation." *Minority Enterprises, Inc.*, ASBCA Nos. 45549 *et al.*, January 23, 1995, 95-1 BCA ¶ 27,461 at 136,830, quoting *Willems Indus., Inc. v. United States*, 155 Ct. Cl. 360, 295 F.2d 822, 831 (1961), *cert. denied*, 370 U.S. 903 (1962); see also *Lisbon Contractors, Inc. v. United States*, 828 F.2d 759, 767 (Fed. Cir. 1987). A claimant generally "cannot satisfy that burden simply by pointing to an accountant's summary or compilation of financial data." *Minority Enterprises, Inc.*, *supra*, at 136,830; *Mediatrix Interactive Technologies, Inc.*, ASBCA Nos. 43961, *et al.*, March 31, 1999, 99-1 BCA ¶ 30,318 at 149,927. While a claimant "need not present at a hearing all backup records for a compilation or have a witness testify about each cost item set forth, it must present probative evidence with respect to the incurrence and assembly of the costs compiled." *Minority Enterprises, Inc.*, *supra*, at 136,830-31; see *Ordnance Materials, Inc.*, ASBCA No. 32371, June 8, 1988, 88-3 BCA ¶ 20,910 at 105,706; *Edward R. Marden Corp.*, VABCA No. 1833, April 29, 1985, 85-2 BCA ¶ 18,083 at 90,781.

## X. NO DAMAGES FOR DELAY CLAUSE

Another issue dividing the parties concerns the contract's "No Damages for Delay" clause.<sup>212</sup> R4, K0040 (Contract Article 17, amend. 2). This was a contract-specific provision drafted by AOC. The clear intent of the No Damages for Delay clause was to limit AOC's liability (by limiting the contractor's recovery) for government-caused "delays, interferences, disruptions, suspensions, changes in sequence or the like." *Id.* This was to be achieved primarily by means of the clause's definition of the term "damages," which precluded the recovery for delay of all "indirect and/or impact costs," which the clause further defined, while specifically allowing the recovery of "on-site direct costs" (which the clause also further defined). *Id.* The No Damages for Delay clause also required any contractor recovery of direct costs to be consistent with its own cost accounting practices and the FAR cost accounting principles. *Id.*

As with many other aspects of this case, the parties have advocated opposite positions regarding the effect of the No Damages for Delay clause. AOC maintains that this clause prohibits the recovery of many of the delay-related costs claimed by Clark and its subcontractors. Clark argues that, under the circumstances of this case, this clause should not be enforced at all. We find the clause is enforceable, but do not interpret it as broadly as AOC maintains.

Although "no damages for delay" clauses are commonly used in commercial and state and local government construction contracts, they appear to be no longer in common use in federal government contracts. McBride & Touhey, *Government Contracts*, § 32.10[4]. However, such clauses have been generally enforced when included in federal government contracts, where the language in the clause plainly prohibits the recovery of delay caused costs. *Wells Bros. Co. of N.Y. v. United States*, 254 U.S. 83 (1920); *A.S. McGaughan Co., Inc.*, PSBCA No. 2074, October 19, 1989, 90-1 BCA ¶ 22,411 at 112,569-70. As observed by the Supreme Court with regard to the enforceability of a no damages for delay clause:

Men who take million-dollar contracts for Government buildings are neither unsophisticated nor careless. Inexperience and inattention are more likely to be found in other parties to such contracts than the contractors, and the presumption is obvious and strong that the men signing such a contract as we have here protected themselves against such delays as are complained of by the higher price exacted for the work.

*Wells Bros. Co. of N.Y. v. United States*, 254 U.S. at 87.

Nevertheless, given their potentially harsh effect, no damages for delay provisions should be strictly construed, but generally will be enforced, absent delay (1) not contemplated by the parties under the provision, (2) lasting an unreasonable period and thereby amounted to an abandonment of the contract, (3) caused by fraud or bad faith, or (4) amounting to active interference or gross negligence. *E.C. Ernst, Inc. v. Manhattan Constr. Co. of Texas*, 551 F.2d 1026, 1029 (5<sup>th</sup> Cir 1977), *cert. denied*, 434 U.S. 1067 (1978); *Ozark Dam Constructors v.*

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<sup>212</sup> The full text of this clause appears in Appendix 1 of this decision.

*United States*, 130 Ct. Cl. 354, 359-60, 127 F. Supp. 187 (1955); McBride & Touhey, *Government Contracts*, § 32.10[4].

The typical no damages for delay clause limits the contractor's remedy, where there is a delay under a contract for whatever reason, to only an extension of contract time and expressly prohibits any monetary remedy for the delay. 73 ALR 3<sup>rd</sup> 187 § 1[c]; McBride & Touhey, *Government Contracts*, § 32.10[4]; Barry B. Bramble and Michael T. Callahan, *Construction Delay Claims*, § 2.16 (3<sup>rd</sup> ed. 2000). Indeed, that was the type of clause that was included in the original solicitation here. R4, K0040 (Contract Article 17, prior to amend. 2).<sup>213</sup>

However, in response to complaints from prospective offerors, AOC issued amendment No. 2, which included the No Damages for Delay clause ultimately included in this contract. This clause expressly allows the recovery of monetary delay damages so long as they were "direct costs necessarily incurred" as a result of the delay,<sup>214</sup> and only precludes the recovery of "indirect and/or impact costs," which includes "without limitation: unabsorbed Home Office Overhead (including calculations under the 'Eichleay Formula'), Idle Labor and Equipment, Loss of Productivity, and Interest."<sup>215</sup> R4, K0040 (Contract Article 17, amend. 2).

Thus, the No Damages for Delay clause ultimately included in the contract here is essentially a misnomer, as it does not immunize AOC from monetary liability for delays, even those caused by its negligence, but only limits the types of costs that can be recovered for delay under the

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<sup>213</sup> As initially issued, the No Damages for Delay clause read:

1. The Architect shall not be obligated or liable to the Contractor for, and Contractor hereby expressly waives any claims against the Architect on account of any damages, of any nature whatsoever, which the Contractor, or its subcontractors at any tier may incur as a result of delays, interferences, disruptions, suspensions, changes in sequence or the like arising from or out of any act or omission of the Architect, it being understood and agreed that the Contractor's sole and exclusive remedies in such event shall be an extension of the contract time, but only in accordance with the provisions of the Contract Documents.
2. To the extent that any other provision of this contract is inconsistent with the provisions of this article, such other articles will be superseded hereby with respect to the issue of delay damages.

R4, K0040 (Contract, Article 17, prior to amend. 2).

<sup>214</sup> "Direct costs" are defined in the clause as including "on-site direct costs, which shall include direct labor (superintendence, labor, time-keeping, and clerical work) direct materials and supplies (including material handling), direct equipment, restoration and cleanup, overhead and profit (but only as permitted under the Official Procedure for Making Changes in Contracts), taxes, insurance, and bonding costs." R4, K0040 (Contract Article 17, amend. 2).

<sup>215</sup> This clause also provides: "To the extent that any other provision of this contract provides for the payment of damages, as defined in this Article, to the Contractor, and is thus is inconsistent with the provisions of this Article, such other provision will be superseded hereby with respect to the issue of damages." R4, K0040 (Contract Article 17, amend. 2).

Changes clause.<sup>216</sup> Limitations on contractor recovery under the Changes clause have been upheld by the Court of Appeals for the Federal Circuit. *Reliance Ins. Co. v. United States*, 931 F.2d 863, 865-66 (Fed. Cir. 1991) (10 percent limitation on recovery of overhead costs included in contract enforced on delay claim under changes clause). Under the circumstances, we are not persuaded that there should be the same reluctance to enforce the terms of this clause as there may be with a typical no damages for delay clause.<sup>217</sup> Nevertheless, because of the potential harsh effects of the No Damages for Delay clause, we will strictly construe the clause in interpreting it.<sup>218</sup> See *E.C. Ernst, Inc. v. Manhattan Constr. Co. of Texas*, 551 F.2d at 1029.

## **XI. CLARK'S CLAIMS ON OWN BEHALF**

### **A. Home Office Overhead**

Clark's revised claim seeks recovery of \$179,206 in home office overhead. Clark now computes its home office overhead amount at a rate of 1.73 percent of the \$10,358,711 subtotal of claimed delay, acceleration, and change order costs. App. Exh. 139.

In its audit of Clark's appeal, the Defense Contract Audit Agency (DCAA) questioned Clark's claimed 2.17-percent home office overhead rate and instead determined that 1.73 percent was appropriate.<sup>219</sup> DCAA Audit of Clark at 13. Clark accepted DCAA determination and revised its claim to reflect the 1.73-percent overhead rate. H.Tr., McBride, 22:76. We find no reason to question the 1.73-percent home office overhead rate now claimed by Clark.

Notwithstanding Clark's acceptance of the home office overhead rate deemed appropriate by DCAA, AOC argues that Clark's claim here should be rejected for various reasons. First, AOC asserts that "as to its base contract work, Clark already had overhead in the amount of the award of its original contract," and "[a]s to approved and paid change order work, Clark already has

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<sup>216</sup> As indicated above, the Changes clause applies to all of Clark's recoverable delay damage claims under this contract.

<sup>217</sup> Clark has also failed to show that any of the circumstances that would cause this clause to be unenforceable are applicable in the present case. In this regard, this provision limiting damages for delay clearly envisioned the type of claimed delay, e.g., defective specifications, contemplated by the parties, as indicated by the inclusion of the Changes and Suspension of Work clauses under which claims for delay damages could be pursued under the contract and by the references included in the No Damages for Delay clause to the change procedures under the contract. See *PYCA Indus. v. Harrison County*, 177 F.3d 351, 364-65 (5<sup>th</sup> Cir. 1999). Clark suggests bad faith and active interference on the part of AOC should cause the clause to be unenforceable. However, as indicated by our earlier discussion of the causes for delay, neither party was without fault in the administration and performance of this contract, and in fact the bulk of the delay was Clark's responsibility.

<sup>218</sup> While Clark in its post-hearing brief argues that this clause is not applicable to subcontractor delay claims, App. PFF ¶ 382 n.15, the clause by its terms expressly applies to delay claims by "subcontractors at any tier." R4, K0040 (Contract Article 17, amend. 2).

<sup>219</sup> At AOC's request, DCAA audited and issued reports concerning the claims of Clark and its major subcontractors, including Clark Concrete, Standard Iron, Rough Brothers, and Kirlin.

been compensated for overhead on the cost of such work . . . .” Resp. PFF, part 1, § III.C.3. AOC also contends that Clark’s overhead claim is a duplication of its “excess general conditions” claim. Resp. Reply Brief, part V, tab VIII. Lastly, AOC contends that by reason of the contract’s No Damages for Delay provision, Appellant is contractually precluded from recovering overhead on or for any delay claim.<sup>220</sup> *Id.* We disagree with all of AOC’s points.

First, AOC is factually incorrect in its belief that Clark’s overhead claim here extends to either base contract work, or approved and paid change order work, or both. Instead, Clark seeks the recovery of home office overhead upon only its own claimed delay, acceleration, and change order costs. Moreover, the fact that Clark’s base contract price and/or approved contract change orders include home office overhead does not preclude its allowability as part of the claim here. A contractor incurs overhead expenses as a necessary aspect of doing business, and the fact that such indirect costs are not allocable to the performance of any one contract makes them no less important to the contractor or beneficial and of value to the contract. *See* FAR § 31.203. Clark has remained consistent in its cost accounting practice of recovering its home office overhead expenses as a markup of its allowable direct costs, and we find no reason to question that practice here.

AOC is also incorrect in its assertion that Clark’s claim for home office overhead is duplicative of its claim for excess general conditions. As set forth above, Clark’s general conditions costs represent those direct expenses associated with its role as general contractor for a specific project (*e.g.*, project supervision, project permits). Clark’s home office overhead, by contrast, represents those indirect expenses incurred by the contractor that are necessary to the operation of the company as a whole and which indirectly benefit every contract being performed. AOC has not shown, and the record does not support, that any of the specific expenses that comprise Clark’s general conditions costs are also part of its home office overhead rate. In this regard, the DCAA audit performed here also found no evidence that Clark’s home office overhead was duplicative of its general conditions costs. DCAA Audit of Clark at 13-14.

We also find that Clark’s recovery of home office overhead is not precluded by the contract’s No Damages for Delay provision, given that it expressly permits the recovery of an overhead markup consistent with the Official Procedure for Making Changes in Contract provision. R4, K0040. Accordingly, we find that Clark is entitled to home office overhead at a rate of the 1.73 percent that will be applied to Clark’s allowable delay, acceleration, and change order costs.

## **B. Profit**

Clark’s revised claim seeks \$2,595,653 in profit. Clark calculated this amount by applying a 10-percent rate to its total claimed costs (comprised of the \$29,027,233 subtotal of “current contract costs,” the \$10,358,711 subtotal in claimed delay, acceleration, and change order costs, and the \$179,206 in home office overhead), and then subtracting the \$1,360,862 in claimed excess general conditions costs.<sup>221</sup> App. Exh. 139. Clark argues that both its entitlement to

<sup>220</sup> AOC’s other arguments for disallowance of Clark’s claim to home office overhead are essentially tied to Clark’s claim for profit, and will be addressed in that part of the decision.

<sup>221</sup>  $\$39,565,150 \times 10\% = \$3,956,515 - \$1,360,862 = \$2,595,653.$

profit and the method by which it calculated the amount claimed here are reasonable and proper. AOC does not dispute Clark's recovery of profit where the contractor's entitlement to an equitable adjustment is found, but contends that the calculation method employed, and thus the amount sought, here by Clark are improper.

The Changes clause provides the contractor with a right to an equitable adjustment in contract price when its costs of performance are increased as a result of changes (both actual and constructive) made to the work by the government. FAR § 52.243.4 (Aug. 1987). While the clause does not define "equitable adjustment," it is well established that the term includes "a reasonable and customary allowance for profit." *United States v. Callahan Walker Constr. Co.*, 317 U.S. 56, 61 (1942). Accordingly, we find that Clark is entitled to an allowance for profit as part of its equitable adjustment here.

The allowability of the amount of profit claimed by Clark is integrally related to the format of the revised claim itself. As detailed above, the base amount to which Clark applied its 10-percent profit rate was derived by removing its anticipated profit on the original contract work and the agreed-upon markups from approved change orders, then using total contract costs for the original contract work, settled contract modifications, and additionally claimed costs as the basis for its profit markup. Computed in such a manner, Clark not only seeks to recover profit on the additional amounts now claimed for government-caused delays, acceleration, and change orders, but also to reprice its profit on the original fixed-price contract work as well as settled contract modifications. We find no basis in law or fact to support this methodology.

An equitable adjustment is a "corrective measure[] utilized to keep a contractor whole when the Government modifies a contract," *Bruce Constr. Corp. v. United States*, 163 Ct. Cl. 97, 100, 324 F.2d 516 (1963), and should not increase or decrease a contractor's loss at the expense of the Government. *Nager Elec. Co., Inc. v. United States*, 194 Ct. Cl. 835, 853, 442 F.2d 936 (1971). Similarly, an equitable adjustment may not properly be used as an occasion for reducing or increasing the contractor's profit or loss, or for converting a loss to a profit, or vice versa, for reasons unrelated to a change. A contractor who has underestimated his bid or encountered unanticipated expenses or inefficiencies may not properly use a change order as an excuse to reform the contract or to shift his own risks or losses to the Government. *Pacific Architects & Eng'rs, Inc. v. United States*, 203 Ct. Cl. 499, 508, 491 F.2d 734 (1974), *Nager Elec. Co.*, 194 Ct. Cl. at 945-46; see *J.F. Shea Co., Inc. v. United States*, 10 Cl. Ct. 620, 627 (1986); *Condor Reliability Servs., Inc.*, ASBCA No. 40538, August 23, 1990, 90-3 BCA ¶ 23,254, at 116,675-76. In other words, "[p]rofit is applied to the additional work only; it does not serve to reprice the entire contract or the unchanged work, and does not alter the original terms of the parties' bargain. The parties remain in the same relative profit or loss position on the bid work as before." *Stewart & Stevenson Servs., Inc.*, *supra*, at 145,522; *Condor Reliability Servs., Inc.*, *supra*, at 116,675-76; *Swanson Printing Co.*, GPOBCA Nos. 27-94, 27A-94, November 18, 1996, 1996 GPOBCA LEXIS 38.

We find no valid reason to allow Clark to reprice its profit on original contract work or on work for which the parties have executed contract modifications. Quite simply, the extent to which Clark did or did not include profit in the initial contract work is not a proper factor in determining the extent to which a contractor should recover profit on its claims based on

changed requirements, government-caused delay and constructive acceleration. Moreover, the contractor has failed to demonstrate any reason why it is entitled to renegotiate its profit for the original contract requirements under this fixed-price contract, which placed the risks and benefits of the actual cost of performance on the contractor. Accordingly, we find that Clark's recovery of profit should be based only on the equitable adjustment costs to which it is entitled.<sup>222</sup>

We further note that Clark's claim for profit fails to distinguish between claims for work performed by itself and the work performed by its subcontractors. Under the contract's Official Procedure for Making Changes in Contracts, the prime contractor is to receive profit at a rate not to exceed 10 percent upon the cost of work performed by its own organization. R4, K0188. For the cost of work performed by subcontractors, however, the contract limits the prime contractor's recovery to a rate of not to exceed 10 percent for both overhead and profit. *Id.* Accordingly, we find that Clark is entitled to a 10-percent profit on those portions of the allowable claim performed by Clark itself (in addition to the 1.73-percent home office overhead markup). By contrast, Clark is entitled to an 8.27-percent profit (10 percent minus 1.73 percent for home office overhead) on those portions of the allowable claim performed by its subcontractors.

### C. Proposal Preparation Costs

Clark also seeks to recover \$132,806 for its proposal preparation costs. This aspect of Clark's claim represents the actual costs that the contractor incurred for the consultant services rendered by Peterson Barrington in March and April 2002 to prepare the scheduling analysis portion of Clark's May 16, 2002 claim. App. Exh. 96.

Clark does not dispute that the costs incurred by a contractor in connection with the prosecution of claims against the federal government, including consultant services costs, are generally unallowable. *See Singer Co. Librascope Div. v. United States*, 215 Ct. Cl. 281, 326; 568 F.2d 695 (1977); *Stewart & Stevenson Services, Inc.*, ASBCA No. 43631, September 23, 1997, 97 2 BCA ¶ 29,252 at 145,521; *P&M Indus., Inc.*, ASBCA No. 38759, September 29, 1992, 93-1 BCA ¶ 25,471 at 126,870. Instead, Appellant argues that its May 16, 2002 submission was not a claim but an equitable adjustment proposal. Appellant points to the fact that its submission was styled as a "request for equitable adjustment," and contends that the costs incurred in preparing equitable adjustments are recoverable.<sup>223</sup> App. PFF ¶ 499; App. Reply Brief at 60-61. We disagree.

Various courts have examined the issue of whether a contractor's submission constitutes a claim for purposes of the recovery of preparation expenses. In *Singer Co. Librascope Div. v. United States*, 215 Ct. Cl. at 281, the contractor sought recovery of attorneys' fees incurred in

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<sup>222</sup> While we specifically requested at the conclusion of the hearing that Clark provide its rationale for repricing profit on the original contract work as well as the settled change orders, *see* H.Tr. 29:204, Clark elected not to do so.

<sup>223</sup> Clark also argues that it was forced to hire Peterson Barrington to prepare its proposal because of AOC's failure to acknowledge the government-caused delays encountered by Clark on the project. App. Reply Brief at 60-61.

connection with the preparation and documentation of its claims for equitable adjustment that it presented to the contracting officer. In denying recovery of the costs, the court held:

Here, the claims for equitable adjustment were not presented to the contracting officer until all work had been completed, they addressed no situation in which Government liability was clear or apparent and, in content, they offered nothing that could reasonably be considered as benefiting the contract purpose. Judged both from the standpoint of the time of their submission and the purpose of their submission, [the contractor's] requests for equitable adjustment were not performance-related; they bore no beneficial nexus either to contract production or to contract administration.

*Id.* at 328. Similarly, in *Bill Strong Enterprises, Inc. v. Shannon*, 49 F.3d 1541 (Fed. Cir. 1995), *overruled in part on other grounds*, 60 F.3d 1572, 1579 (Fed. Cir. 1995), the court stated:

In classifying a particular cost as either a contract administration cost or a cost incidental to the prosecution of a claim, contracting officers, the Board, and courts should examine the objective reason why the contractor incurred the cost. *See Singer*, (judging the "purpose" of the contractor's submission). If a contractor incurred the cost for the genuine purpose of materially furthering the negotiation process, such cost should normally be a contract administration cost allowable under FAR [§ 31.205-47(f)(1)]. On the other had, if a contractor's underlying purpose for incurring a cost is to promote the prosecution of a . . . claim against the Government, then such cost is unallowable under FAR [§ 31.205-47(f)(1)].<sup>224</sup>

*Id.* at 1550 (citation omitted).

Here, from September 2001 until mid-March 2002, Clark and AOC undertook various efforts to reach agreement on the disputed issues. These attempts ended unsuccessfully. As described by Clark:

Despite these efforts, precious little--only a few change orders, to be specific--have been resolved since the Project was substantially completed in September 2001. The AOC has made no offers of global resolution. Nor has it agreed to mediation, nor to any of several suggested forms of 'fast-track' dispute resolution. There is thus no agreement on significant issues, and indeed even no agreement on a relatively prompt process to resolve the issues.

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<sup>224</sup> While we recognize that the FAR is not generally applicable to AOC procurements like this contract, FAR § 31.205-47(f)(1) implements the generally recognized principle that the costs of pursuing claims against the government are not generally recoverable unless specifically allowed. *See Piggly Wiggly Corp.*, 112 Ct. Cl. 391, 432, 81 F.Supp. 819 (1949), which stated the general rule that attorneys fees are not allowed in suits against the United States in the absence of express statutory authority allowing them. Clark has not argued, much less pointed to, any such applicable statutory authority here.

In Clark's view, then, whatever the obligations are . . . to use good faith efforts to reach agreement have been fulfilled by Clark.

REA, Executive Summary at 2.

On May 16, 2002, more than 8 months after completion of work and 2 months after the parties' efforts at agreement had ended, Appellant submitted "this document to the Contracting Officer as a claim for decision on questions of fact raised hereby." *Id.* Appellant's submission included a detailed narrative of the delay, acceleration, and change order damages incurred, contained 21 supporting exhibits, and concluded with a request for a contracting officer's decision. *Id.*

We find that the claimed consultant services costs were not part of its efforts to reach agreement with AOC. Instead, the costs here were not incurred until after efforts at negotiation and agreement had ended. We also find that the proposal that Peterson Barrington helped to prepare and which Clark submitted to the contracting officer on May 16, 2002 constituted a claim. As evidenced by the timing of its submission, the purpose of Clark's proposal here was to promote the prosecution of a claim against the government. Unlike the case cited by Clark, *Allied Materials & Equipment Co.*, ASBCA No. 17318, February 28, 1975, 75-1 BCA ¶ 11,150 at 53,086, in which the government's liability was clear or apparent, Clark's submission here addressed no situation in which Government liability was clear or apparent. As Clark's proposal constituted "a claim for decision on questions of fact raised hereby," the consultant services costs incurred by Clark to assist in its preparation are unallowable.

#### **D. Excess General Conditions Delay Claim**

As part of its revised claim, Clark now seeks \$1,360,862 in delay damages. App. Exh. 139. Clark's delay claim is based wholly upon its extended job performance. Specifically, Clark argues that as the general contractor it worked on the project site for the entire duration. Clark alleges that while the original schedule called for the project to be completed by September 5, 2000, AOC caused a 360-day delay so that substantial completion of the contract was not until August 31, 2001. Clark contends that the project delays caused it to incur duration-related damages for maintaining its personnel and equipment at the project site after the originally scheduled completion date. Clark has submitted an "excess general conditions costs" claim to quantify its delay damages. App. Exh. 139.

General conditions costs refer to those overhead expenses incurred by a contractor in connection with the supervision and administration of a specific project, and which a contractor generally budgets and accounts for in a direct cost manner. Bramble and Callahan, *Construction Delay Claims* § 12.05.<sup>225</sup> General conditions costs commonly include such items as project management, field office expenses, periodic cleanup, and job safety expenses. *Id.*;

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<sup>225</sup> Care must be taken to distinguish general conditions costs from main office overhead, as the latter reflects those costs that cannot be directly attributed to a particular job but are necessary to run an organization, and which the contractor accounts for in an indirect manner. Bramble and Callahan, *Construction Delay Claims* § 12.05.

*see Gladwynne Constr. Co.*, VABCA Nos. 6594, *et al.*, April 19, 2002, 02-1 BCA ¶ 31,848 at 157,375.

Clark budgeted and accounted for its general conditions costs (“Division 01 Costs”) as a direct expense of the Botanic Garden renovation contract. In addition to developing an original budget when bidding the job for each subcontracted construction trade, Clark developed an original budget for its general conditions costs in the amount of \$2,540,727. C4 Supp. 13 0057-58; H.Tr. Erdelsky 27:174-75. Also, consistent with its previous practice, Clark conducted an internal “project plan” shortly after contract award, which reviewed the goals, objectives, and schedules for the project. H.Tr., McBride, 22:66. Clark’s project plan resulted in a revised project budget, or “true up,” which reflected the contractor’s actual expected costs (as opposed to what had been developed for bid purposes). *Id.*; H.Tr., Erdelsky, 27:174-75. As part of the project plan, Clark determined that it had underbid its general conditions costs by \$344,527.<sup>226</sup> C4 Supp. 13 0063.

Clark’s revised claim for excess general conditions was calculated using the costs the contractor incurred subsequent to the original September 5, 2000 contract completion date.<sup>227</sup> Clark argues, in support of its chosen methodology, that because the excess general conditions expenses claimed here were incurred after the scheduled completion date, they are, of necessity, outside of the contractor’s planned or budgeted general conditions costs for the original contract period.<sup>228</sup> App. Reply Brief at 37.

Courts and boards of contract appeals have commonly recognized that excess, or extended, general conditions are a cost of delay. As stated by the District of Columbia Contract Appeals Board in *MCI Constructors, Inc.*, DCCAB No. D-924, 44 D.C. Reg. 6444, June 4, 1996, 1996 DCCAB LEXIS 71); “[a]dditional . . . general conditions costs, incurred by a contractor by virtue of having to perform contract work for an additional duration beyond what it would have had to perform but for delay and disruption for which the government bears cost responsibility, are recoverable.” *Id.*, citing *Williams Enterprises, Inc. v. Strait Mfg. & Welding, Inc.*, 728 F. Supp. 12, 19-20 (D.D.C. 1990), *aff’d sub nom.*; *George Hyman Constr. Co.*, ENGBCA No. 4541, January 11, 1985, 85-1 BCA ¶ 17,847 at 89,353; *Shirley Contracting Corp.*, ASBCA No. 29848, December 27, 1984, 85-1 BCA ¶ 17,858 at 89,406. Moreover, as a contractor’s

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<sup>226</sup> Clark’s claim indicates that the underbid amount for entire contract was \$359,527. App. Exh. 139, attach. 2; H.Tr., McBride, 22:66. Clark accounted for its higher revised general conditions budget by reducing the amount of its expected profit. H.Tr., McBride, 22:66.

<sup>227</sup> Clark employed a total cost approach in its original \$1,643,100 claim for excess general conditions submitted with its appeal, applying its approach to 19 general conditions cost categories, rather than the 41 categories that served as the basis for the revised claim. Appeal at 39. Besides questioning the total cost approach, DCAA questioned a total of \$639,533 in claimed excess general conditions costs, in part because certain costs were also claimed as change orders (and thereby double-counted) and because Clark selectively alternated between its original and revised budgets in computing the amounts claimed. DCAA Audit of Clark at 16-19.

<sup>228</sup> We note that while the actual extended performance period was September 5, 2000 to August 31, 2001, a total of 360 days, Clark’s excess general conditions claim is based on the costs it incurred for the time period from October 1, 2000 to September 30, 2001. App. Exh. 139; C4 Supp. 13 0063-66. There is no explanation for this discrepancy.

excess general conditions costs are a function of the length of the delay, a contractor's claim for excess general conditions should be based on those costs that are "time-sensitive" in nature and that would be affected by an extended performance period. Bramble and Callahan, *Construction Delay Claims* § 12.05.

We note that here Clark does not claim all of its extended general conditions costs, but only those that it determined to be time sensitive. Eddie McBride, Clark's director of cost engineering, testified that Clark's claim was derived by taking into account the general conditions cost codes which were time sensitive (*i.e.*, variable depending upon duration of time) and excluding those general conditions line items that were measured on some variable other than time. H.Tr., McBride, 22:73. Clark's cost reports demonstrate that while the contractor had a total of 64 general conditions costs categories, the costs in 41 specific categories were captured for purposes of its claim. *Compare* C4 Supp. 13 0057-58 with C4 Supp. 13 0063. The DCAA auditor did not dispute this aspect of Clark's testimony. *See* H.Tr., Erdelsky, 27:165-87. Based on our own review of the contractor's cost reports, we also find that Clark removed from consideration those general conditions costs that were not time sensitive (*e.g.*, bonds, insurance), and that the 41 cost categories remaining in its excess general conditions claim are all time-sensitive ones.<sup>229</sup> C4 Supp. 13 0057-58. We therefore accept the general conditions cost categories used by Clark for purposes of determining the amount of Clark's delay damages.<sup>230</sup>

Many ways to calculate excess general conditions have been used and accepted by courts and boards of contract appeals. The most frequently used method is to compute a daily rate by dividing the total general conditions costs on the project by the total days of contract performance and then multiplying the result by the number of days of compensable delay. *See MCI Constructors, Inc.*, DCCAB No. D-924, 44 D.C. Reg. 6444, June 4, 1996, 1996 DCCAB LEXIS 71; *see Santa Fe Eng'rs, Inc.*, ASBCA No. 31762, October 30, 1990, 91-1 BCA ¶ 23,571 at 118,194-96; *George Hyman Constr. Co.*, *supra*, at 89,353. An alternative method would be to determine the actual costs during the actual delay period. Bramble and Callahan, *Construction Delay Damages*, § 12.05.

Clark's revised claim employs neither of these methods, but instead calculates the actual costs it incurred during the period of extended performance. For a variety of reasons, we find that Clark's methodology was inappropriate to reasonably calculate its delay damages. First, this method does not account for, and therefore includes, costs that were merely delayed and would have been incurred in any event under the contract, as opposed to being incurred because of the extended nature of the contract. Clark's method also fails to address the fact that its general conditions costs were underbid; as the purpose of an equitable adjustment is to make the contractor whole when the Government makes changes that affect the costs of performance, *see Nager Elec. Co., Inc. v. United States*, 194 Ct. Cl. at 853, an equitable adjustment must reflect "the difference between the reasonable cost of performing the work with and without the

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<sup>229</sup> The record contains no explanation as to why Clark's initial claim only considered 19 cost categories, but our review confirms that the 41 used in the revised claim are all time sensitive.

<sup>230</sup> While AOC asserts that these delay damages are precluded by the No Damages for Delay clause, this clause limits recovery of home office indirect costs and is simply not applicable to the field office costs represented in the 41 general conditions categories claimed here. R4, K0040.

change.” *B.R. Servs., Inc.*, ASBCA Nos. 47673 *et al.*, May 19, 1999, 99-2 BCA ¶ 30,397 at 150,261. In addition, Clark’s calculation should also take into account that substantial completion of the contract was on August 31, 2001, given that Clark has not explained why it should be entitled to costs incurred after that date. Lastly, as indicated above, the delays to the Botanic Garden renovation project were only partially AOC’s responsibility, and any method of determining delay damages must reflect only the proportionate recovery to which Clark is entitled.

We find that the method that most accurately accounts for the unique conditions here, and that provides a fair and reasonable approximation of the additional costs incurred by Clark as a result of contract delays, is a daily rate based on Clark’s general conditions costs for the entire contract period, as adjusted by the contractor’s underbid amount. Clark’s cost records indicate that its general conditions costs (for the time-sensitive categories) through August 31, 2001 totaled \$2,910,673, C4 Supp. 13 0065, and that the underbid amount was \$344,527. C4 Supp. 13 0063. Accordingly, we calculate Clark’s excess general conditions recovery as follows:

General Conditions Costs	\$2,910,673
Underbid Amount	<\$344,527>
Subtotal	\$2,566,146
Daily Rate (1,066 days) <sup>231</sup>	\$2,407.27 <sup>232</sup>
Extended Period (360 days) <sup>233</sup>	\$866,617

As discussed above, there were concurrent causes for the contract delay and Clark can only recover its damages if they can be apportioned to only allow for recovery of delay damages that were caused by AOC. We can apportion the delay damages here to account for AOC’s relative responsibility and find that Clark may recover 120.4/421 of the \$866,617 in allowable costs resulting from the extended period of performance. We therefore find that Clark is entitled to recover \$247,840 in excess general conditions costs.

#### E. Acceleration Claim

Clark’s revised claim seeks acceleration costs in the amount of \$551,973. App. Exh. 139 at 1. Clark argues that on three separate occasions it was directed by AOC to accelerate its performance on the renovation project: (1) the April 6, 2000 letter from Mr. Hantman (C4 Supp. 22 1711-12); (2) the September 11, 2000 letter from Mr. Krapp (Resp. Exh. 94); and (3) the February 5, 2001 cure notice (App. Exh. 52). App. PFF ¶ 411. Clark contends that given the government-caused delays and AOC’s denial of Clark’s requests for time extensions, the foregoing letters constituted constructive accelerations for which Clark is entitled to an equitable adjustment for its acceleration damages. *Id.* Clark also alleges that in response to AOC’s

<sup>231</sup> There were a total of 1,066 calendar days from the October 1, 1998 contract award to the August 31, 2001 substantial completion date.

<sup>232</sup> \$2,566,146 ÷ 1,066 days = \$2,407.27.

<sup>233</sup> \$2,407.27 x 360 days = \$866,617.

directives it increased its manpower on the project, resequenced trades as necessary, and increased the hours it worked. *Id.* According to Mr. Dylus, Clark's acceleration claim represents those expenses incurred directly by the contractor for accelerating its work on the renovation project. *See* H.Tr., Dylus, 22:143-45

To properly consider Clark's claim here, the contractor's accounting system must first be considered. The record shows that Clark's accounting system has the capability of capturing costs at a very detailed level, provided that an appropriate charge number is created and the costs are so coded at the time of incurrence. DCAA Audit of Clark, June 20, 2003, at 35. Specifically, Clark's accounting system can track costs by job, and can then establish virtually an unlimited number of cost codes within a specific job. The accounting system can also track costs by type within a cost code or an activity. Indeed, Mr. McBride testified, "[w]e track labor, equipment owned and outside rentals, materials consumables, unit price of contract and lump sum subcontracts as different cost types within the cost code." H.Tr., McBride, 22:61.

During the course of the renovation project, Clark created a separate cost code (*i.e.*, 810139, named "acceleration") to capture the labor, material, and equipment costs ostensibly incurred as a result of its acceleration efforts. H.Tr., Dylus, 22:138; *see* App. PFF ¶ 414. As Respondent acknowledges, Clark personnel would on a contemporaneous basis place labor and materials charges into its acceleration cost code. *See* Resp. PFF, part 1, § I.B.2, at 1. For example, Clark's laborers completed daily employee time cards, indicating the type of work, the amount of work, and the applicable cost code (acceleration or otherwise).<sup>234</sup> H.Tr., Dylus, 22:212. These time cards were reviewed by a foreman and approved by a superintendent before being entered into the accounting system. *Id.* Similarly, Clark supervisory personnel determined during the course of the project the material and equipment rental invoices that were to be charged to the contractor's acceleration cost code. *Id.* at 22:223. Clark used the total costs charged to the 810139 job code, plus an estimated additional amount not captured under the job code, as the basis of its original \$712,736 acceleration claim. DCAA Audit of Clark, June 20, 2003, at 9; *see* H.Tr., Dylus, 22:143.

DCAA audited Clark's original acceleration claim and questioned the entire amount. DCAA Audit of Clark at 8. Specifically, DCAA questioned certain costs as being unsupported by the underlying cost data (\$86,893), and other costs as being outside the period of claimed acceleration (*i.e.*, before April 7, 2000 or after September 30, 2001) (\$50,731). *Id.* DCAA also questioned the balance of Clark's acceleration claim because it involved more than the premium costs for labor, materials, and equipment that DCAA believed would be indicative of an acceleratory effort. *Id.*

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<sup>234</sup> Clark did not charge all the labor performed during the acceleration period to the acceleration job code, but instead determined on a case-by-case basis what labor hours were part of its acceleration effort. H.Tr., Dylus, 22:212.

At the hearing, Clark revised the amount of its acceleration claim to \$551,973, which Appellant calculated as follows:<sup>235</sup>

<b>Labor</b>	
Field Labor (Regular Hours)	\$246,917
Labor Overtime	\$36,717
Burden on Labor	\$125,111
Subtotal	\$408,745
Adjustments based on Reclassification	<\$10,653> <sup>236</sup>
<b>Net Labor</b>	<b>\$398,092</b>
<b>Equipment, Rentals &amp; Materials</b>	
Clark Equipment	\$3,765
Third Party Rentals	\$83,012
Materials	\$86,897
Subtotal	\$173,615
Adjustments based on Reclassification	<\$19,795>
<b>Net Equipment, Rentals &amp; Materials</b>	<b>\$153,879</b>
<b>Total</b>	<b>\$551,973</b>

App. Exh. 100 at 1, 10, 36; H.Tr., Dylus, 22:218.

As indicated, Clark's revised acceleration claim is based on costs tracked by Clark in cost code 810139. Specifically, Clark totaled the costs within the acceleration job code for the period from January 1, 2000 to September 30, 2001.<sup>237</sup> These costs were reviewed by Mr. Dylus, who removed a total of \$30,448 in expenses he determined were either miscoded or not necessarily related to Clark's acceleration efforts.<sup>238</sup> App. Exh. 100; H.Tr., Dylus, 22:144. As Mr. Dylus testified:

<sup>235</sup> The revised claim did not include any additional estimated amounts beyond those charged to the 810139 job code, as did Clark's initial acceleration claim, but was based only on the contractor's actual costs charged to this code.

<sup>236</sup> We note that although Clark determined that a total of \$10,653 in labor costs were improperly classified as acceleration, the contractor did not identify the specific time cards upon which it made this determination. While Appellant Exhibit 100 states, with regard to the reclassified labor costs, that the "time cards are attached," see App. Exh. 100 at 1, 10, Appellant did not in fact do so. Accordingly, it was not possible to determine when the labor costs that Clark reclassified were incurred.

<sup>237</sup> While there was a total of \$682,000 in costs charged by Clark to the 810139 cost code, Clark determined that the costs incurred after September 30, 2001 were not properly part of its acceleration claim. H.Tr., Dylus, 22:147. Clark provides no explanation as to why its claim here includes costs beginning in January 2000, even though the first alleged AOC directive to accelerate occurred on April 6, 2000, see App. PFFs ¶¶ 411-15, or explanation as to why its claim includes costs through September 30, 2001, even though substantial completion occurred on August 31, 2001. See H.Tr., Dylus, 22:114-15; Kern, 21:34-35; App. PFF ¶¶ 313-15. Thus, these costs are not allowable acceleration costs.

<sup>238</sup> \$10,653 + \$19,795 = \$30,448.

I have recently gone through that [cost code] to scrub it in terms of invoices that are included that shouldn't be, time that is included that shouldn't be and I have revised the number, and that's why this number, [\$]551,973, is different from the number that the AOC has seen previously.

H.Tr., Dylus, 22:138. Mr. Dylus also described the review process he undertook:

Then what I did was is that I went through and I had copies of every -- I had the originals of every invoice that was signed off on that -- under that cost code pulled from the accounting department and I had copies of all the time cards made, and I spent the last few days going through every time card and every invoice to make sure that they were coded correctly and that the charges that were hitting this code were the correct and true costs that should be hitting this code, and I found some issues.

*Id.* at 22:144.

AOC argues that Clark's acceleration claim should be denied in its entirety as to both entitlement and quantum. Resp. PFF, part 1, § I.B.2, at 5. AOC contends that Clark has failed to establish that either the labor or other expenses charged by the contractor to cost code 810139 were in fact expenses incurred by Clark in accelerating its work efforts. *Id.* at 4-5. In support of this contention, AOC points to the fact that Clark's acceleration claim is not limited to incremental, or premium, costs for labor and materials (*e.g.*, overtime).<sup>239</sup>

As set forth above, we find a constructive acceleration resulted from AOC's February 5, 2001 cure notice, but that the earlier letters upon which Clark relies do not satisfy all of the requirements to be considered a constructive acceleration, in particular the requirement that there be an excusable delay. Additionally, the record shows that Clark did in fact accelerate its contract performance from February 5 through August 31, 2001. Mr. Sullivan and Mr. Dylus described and depicted in detail Clark's acceleratory efforts during this period. H.Tr., Sullivan, 13:81-88; Dylus, 22:117-30; App. Exhs. 97, 99. Thus, we find that Clark is entitled to recover its acceleration damages for the period from February 5 to August 31, 2001.

A contractor is not entitled to recover all of the costs it incurred during an acceleration effort, but only the additional costs of an acceleration. See *Prince Constr. Co., Inc.*, DCCAB No. D-1127, May 12, 2003, 2003 DCCAB LEXIS 6. Costs that would have been incurred by a contractor, notwithstanding its accelerated performance, presumably at a later point in time, are not properly acceleration costs. See *P.J. Dick, Inc.*, GSBCA No. 12134, April 19, 1995, 95-2 BCA ¶ 27,664 at 137,928. The allowable costs of acceleration, however, are not limited to the recovery of premium (*e.g.*, overtime) expenses. See *Prince Constr. Co., Inc.*, *supra*. Rather, all allowable

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<sup>239</sup> While AOC also contends that we should draw an adverse inference from the fact that Clark did not, as requested, provide Clark's specific backup for the acceleration claim during discovery, Resp. Reply Brief, part 5, § V, the backup documentation for Clark's acceleration claim was made available at the hearing in time for DCAA to analyze, and provide testimony on Clark's acceleration claim.

and reasonable costs that would not have been incurred by the contractor but for the acceleration are generally recoverable ones.

Here, the record clearly indicates that Clark's acceleration claim does not represent all the costs that the contractor itself incurred during the acceleration period.<sup>240</sup> Instead, Clark's supervisory personnel charged to the acceleration job code those costs it determined on a case-by-case basis were required by the acceleration. H.Tr., Dylus, 22:223. Nonetheless, a key dispute remaining between the parties is whether the costs charged by Clark to the acceleration cost code (especially the non-premium costs) were properly costs of the contractor's acceleration. We find that Clark has satisfactorily established the allowability of these costs.

At the hearing, Mr. Dylus explained in detail that the material and equipment costs claimed by Clark here are ones in furtherance of the Appellant's acceleration. When asked by Respondent to distinguish between costs incurred during the acceleration and costs incurred because of the acceleration, Mr. Dylus stated,

Let me give you an example. There is costs [sic] in here for gravel roadways where we had to--where we built gravel access roads into the National Garden site, because we use that site for staging. Had we not been accelerated, we wouldn't have incurred that cost, so that's an identifiable cost that is a direct result of the acceleration.

*Id.* at 22:224. Similarly, Mr. Dylus described why other material and equipment costs claimed here (e.g., construction grade sand, torpedo heaters, kerosene, plastic walls, plywood partitions, rental equipment, rental equipment repairs, additional lighting) had not been contemplated and would not have been incurred but for Clark's acceleration efforts. *Id.* at 22:117-24, 145, 219-25. In every instance where AOC inquired into the specific cost claimed by Clark, the contractor was able to demonstrate how the expense was one of acceleration.

Mr. Dylus also testified that the labor costs (both regular and overtime) claimed by Clark were only incurred because of the acceleration: "what we're saying is . . . that we shouldn't have performed any of this work" had the contractor not been accelerated. *Id.* at 22:214. A significant portion of the labor costs claimed here by Clark, as evidenced by its daily employee time cards, related to general project cleanup and debris removal.<sup>241</sup> Clark provided a twofold reason why such costs were properly part of its claim: (1) acceleration of the renovation project resulted in additional amounts of rubbish, dust, and debris, thereby requiring additional amounts

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<sup>240</sup> This was true for both Clark's labor hours and material costs. H.Tr., Dylus, 22:212, 222-23; C4 Supp. 13 0057-67.

<sup>241</sup> The DCAA auditor determined that Clark's acceleration claim included approximately \$228,000 in labor costs related to cleanup work. H.Tr., Erdelsky, 27:199. As with other labor activities, not all the project cleanup and debris removal expenses incurred by Clark during the acceleration time period were charged as acceleration. H.Tr., Dylus, 22:222-23; C4 Supp. 13 0057-62. Also, the fact that Clark reduced its budgeted general conditions cleanup costs, as pointed out by AOC, is irrelevant to our determination because Appellant's acceleration claim is not a total cost one.

of cleanup; and (2) Clark performed cleanup work, as well as other minor work, on behalf of its subcontractors in furtherance of the project's acceleratory effort.<sup>242</sup> *Id.* at 22:214-16, 240-42.

We find Clark's explanation here satisfactory in both regards. First, the documentary evidence adequately supports Mr. Dylus's testimony that acceleration of the project resulted in additional amounts of dirt and debris being generated. App. Exhs. 97A-U. AOC has not offered any evidence to rebut Clark's testimony that the project acceleration resulted in the need for additional cleanup efforts. Second, while Clark may not have "back charged" its subcontractors for the cleanup work performed on their behalf in furtherance of the project's acceleration, we know of no reason why these acceleration costs should not be recoverable in nature and amount if a subcontractor (instead of Clark itself) were to be "out of pocket," given that in either case these represented acceleration costs.

Based upon the invoices and time cards that Clark used to track the costs of its acceleration, we find that Clark incurred a total of \$436,946 in allowable acceleration costs from February 5 to August 31, 2001. We computed this amount as follows:

Equipment & Materials	\$129,174
Field Labor	\$192,096
Labor Overtime	\$29,305
Burden on Labor	\$97,024
Adjustments based on Labor Reclassification	<\$10,653> <sup>243</sup>
<b>Total</b>	<b>\$436,946</b>

App. Exhs. 100, 101.

As discussed above, Appellant's acceleration flowed from concurrently caused delay, so that the allowable acceleration costs must be apportioned based on the total amount of excusable delay as compared to the total amount of contract delay. We thus find that Clark is entitled to recover 122.4/421 of its allowable acceleration costs during this period, or \$127,036.

#### **F. Excess Design Costs**

Clark claims that as a result of AOC's defective design of the Palm House structure (which resulted in the suspension of work during Period 4 (discussed above)), Clark incurred \$114,048 in excess design costs for the work of SGH in analyzing the contract design and as-built

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<sup>242</sup> Clark did not pursue reimbursement from its subcontractors for work performed on their behalf when related to the project's acceleration, as it was cheaper for Clark to do the work itself than it was to have the subcontractors return to complete the needed work. H.Tr., Dylus, 22:214-15.

<sup>243</sup> As noted above, Clark did not identify the specific labor time cards that it reclassified. Because most of Clark's acceleration costs occurred during the period from February 5 to August 31, 2001, and because we were unable to determine if any of the labor costs reclassified by Clark were outside of the period here, we used Clark's entire labor reclassification figure (\$10,653) in our calculation.

condition of the Palm House and monitor and developing remedial measures to address overstresses in the structure. App. PFF ¶¶ 392-400; H.Tr., Dylus, 22:131-32; App. Exh. 139.

AOC contends that Clark acted as a volunteer in performing the engineering analysis and design work here because Clark was not directed by AOC to undertake this effort. Furthermore, AOC notes that three of SGH's invoices for the period between July 14, 2001 and October 5, 2001 were not for services related to the Palm House and monitor repairs. Resp. PFF, part 1, § II.B.1, tab 14, at 3; Resp. Reply Brief, part 5, tab II, at 6.

As described above, the Board found a number of design defects, for which AOC was responsible and which necessitated repairs by Clark during Period 4. In fact, we found that almost all of the repairs, for which SGH provided analysis and design services, were necessary. In so finding, the Board did not accept AOC's argument that Clark had acted as a volunteer in performing these repairs; rather, the Board found that AOC through its words and actions had reasonably led Clark to believe that it was the contractor's obligation to perform these repairs which AOC itself had the duty and need to perform. In short, we found that Clark acted appropriately in undertaking to analyze the need for the repairs and performing the repair work.

Clark employed SGH to analyze the as-designed and as-built integrity of, and to design remedial repairs to, the Palm House and monitor. In support of its excess design costs claim, Clark has presented nine invoices from SGH, totaling \$114,048, for services rendered between December 16, 2000 and October 5, 2001. See App. Exh. 96.

While we find that these invoices are reasonable in price, we agree with AOC that Clark failed to establish that SGH's final three invoices (totaling \$12,805) for services rendered in the period between July 14, 2001, and October 5, 2001 were related to the Palm House and monitor repairs. Although AOC specifically challenged these three invoices in its post-hearing brief, see Resp. PFF, part 1, § II, tab 14, at 3, Clark failed to respond to AOC's arguments or provide any evidence to establish that the costs reflected in these invoices were related to the Palm House and monitor repairs. To the contrary, Mr. Dylus testified that SGH's invoices for the period "[f]rom December of 2000 through probably April or May of 2001" were for work associated with the analysis of the Palm House. H.Tr., Dylus, 22:131-32. The three invoices challenged by AOC are not within that period of time. We find that AOC is not liable for the costs reflected on these three invoices.

In sum, we find that Clark is entitled to recover \$101,243 for its claimed excess design costs.<sup>244</sup>

#### **G. Excess Scheduling Consultant Costs**

Clark's revised claim seeks \$257,571 in excess scheduling consultant costs paid to Peterson Barrington. Clark asserts that the government should be liable for these costs because AOC, in its February 5, 2001 cure notice letter to Clark, improperly required Clark to switch back from

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<sup>244</sup> \$114,048 - \$12,805 = \$101,243. We note that Clark's REA apparently did not include these disallowed invoices as it only requested \$101,243 in excess design costs. REA at 14.

the BGR schedule, under which Clark had been managing the project since January 2000, to the AOC-approved baseline CPM schedule.

As set forth above, the contract required Clark to prepare, submit for approval, and update monthly a CPM schedule by which the parties would monitor the progress of the work and establish the value of partial payments. R4, K0096-104. Clark submitted its CPM schedule on January 31, 1999, which AOC approved on April 22, 1999.

Beginning in January 2000, Clark ceased use of the approved baseline CPM schedule and began use of the BGR schedules. As explained above, after meetings with AOC to explore how to address the project delays and to ascertain whether portions of the Botanic Garden could be completed earlier, Clark developed these schedules in an effort to find a way to expedite the contract. According to Mr. Sullivan, the BGR schedules represented a significant resequencing and acceleration of the work activities to allow the contract to be completed by May 2001. H.Tr., Sullivan, 13:53-58. From that time, the BGR schedules were updated on a monthly basis and provided to AOC. *Id.* at 13:38-40.

On February 5, 2001, AOC sent Clark a cure notice citing specific areas of contract performance that needed to be addressed or the contract could be terminated for default. While we elsewhere discuss other areas of this cure notice, one of the points made, which is relevant here, was that “Clark has ignored the [CPM] contract requirements.”<sup>245</sup> App. Exh. 52, attach. 1. Two of the specific examples of this issue, which were cited by AOC and which are relevant here, were that “Clark has abandoned the Approved Project schedule, *i.e.*, the project schedule approved by AOC in accordance with the Contract” and that “Clark has ignored the contract requirement that any proposal for adjustment of the time for completion must be accompanied by a Time Impact Analysis justifying the same.” *Id.* Clark’s response to the cure notice stated in relevant part:

We have retained Peterson/Barrington Consultants to do this work, in accordance with the contract and your request. The task is very time consuming, in part because we have been using the BGR . . . series of schedules to build project beginning in January 2000, rather than updates to the original schedule. The decision to use the BGR schedules followed meetings with AOC personnel to discuss schedule issues and resequence the project in December 1999, and was confirmed in a letter we subsequently received.<sup>246</sup>

C4 Supp. 08 00057-58.

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<sup>245</sup> The cure notice listed numerous examples of why this was the case. The record generally confirms the accuracy of most the examples cited by AOC.

<sup>246</sup> We assume that Clark is referencing AOC’s February 25, 2000 letter here, R4, LTR 1577, as cited in Clark’s post-hearing brief. *See* App. Reply Brief ¶ 139. As indicated above, this letter did not authorize Clark to abandon the contractually required baseline schedule in lieu of the BGR schedules, but only “requested” a schedule, with associated costs, that would allow for the use of the entire facility, except the Palm House, by December 31, 2000, with the Palm House to be completed by March 15, 2001. R4, LTR 1577.

Thereafter, Mr. Kern of Peterson Barrington prepared a fragnet CPM analysis of the schedule based on the contractually approved baseline schedule, which it first submitted to AOC on March 9, 2001 as a "Request For Adjustments To The Time For Completion."<sup>247</sup> C4 Supp. 05 0959-1361. Based on our review of the Peterson Barrington report here, it appears that Clark's claim only relates to the contract requirement for a time impact analysis based on the approved baseline schedule to support any adjustments in time of completion. There is nothing in the record that indicates that this Peterson Barrington cost in any way related to the actual scheduling of the remainder of the contract, or even that Clark managed the remainder of the contract based on updates to the approved baseline schedule.

We find that AOC's directive that Clark recommence use of the baseline CPM schedule was not a change to the contract requirements, but the enforcement of a provision that the Clark had for some time ignored. As use of the approved CPM schedule was expressly required by the terms of the contract, in particular to support requests for extensions for the time for contract completion, this directive does not provide Appellant with a basis to recover the costs claimed here.

Clark does not appear to dispute that the baseline CPM schedule was required by the contract. Rather, Clark argues that the reversion back to the CPM schedule was a change because AOC had required (or directed) Clark to develop and use the alternate BGR schedules instead. However, as discussed above, there is no evidence that AOC directed Clark to develop these schedules. Nor have we found, and Clark has not referenced, any AOC letter or other documentation that accepts the BGR schedules in lieu of the contractually required baseline schedule. Also, we do not consider AOC's receipt and failure to reject the BGR schedule updates during the year 2000 to be the equivalent of accepting the scheduling as contractually binding, given AOC's contemporaneous denial that it was authorizing acceleration of the work, *see* R4, 1577; C4 Supp. 10 0283, and the detailed contract requirements concerning the acceptance and modifications of the baseline CPM schedule.<sup>248</sup>

Lastly, Clark argues that requiring the approved baseline schedule be used instead of the BGR schedule was a useless exercise, because the BGR schedule and its updates were being used to manage the contract and these schedules showed the adjusted contract completion date based on contract delays. However, the contract expressly provides that the only method for adjusting the contract completion date be based upon the submission of fragnets and time impact analyses, based on approved adjustments to the approved baseline schedule, and that these time impact

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<sup>247</sup> This evidently represents the product of the services, for which Clark paid Peterson-Barrington and which are at issue here. *See* App. Reply Brief at 59, *citing* H.Tr., Dylus, 22:132-33. This fragnet analysis of the contract delays was apparently updated by Peterson Barrington through January 14, 2002. App. Exh. 92 at 26. We note that Peterson Barrington's fragnet delay analysis shows a somewhat different critical path than the "as-built windows" analysis prepared by Peterson Barrington in support of its claim and appeal, but that Mr. Kern concluded that the results of the two analyses "provided similar results." *Id.*

<sup>248</sup> In fact, AOC asserts, without rebuttal, that payments to Clark were still based upon the approved baseline schedule. *See* COD, ch. 2, at 16.

analyses were required to be provided "at no cost to the Government."<sup>249</sup> R4, K0097, K0103-04. Given that the BGR schedule was not the approved contract baseline schedule and there are cogent reasons why this unapproved schedule could not serve as a basis to extend the contract completion date,<sup>250</sup> we think AOC's insistence on Clark's compliance with the contract provides no basis to find AOC liable for the resultant costs.

#### **H. Mansfield Company Engineering Support, Clark Change Order No. 810348.**

Clark seeks \$112,109 for additional engineering support by Forrest Mansfield assertedly caused by DMJM's defective and incomplete designs and AOC's failure to timely respond to RFIs. R4, 11368-69. This claim represents the total invoices submitted by Mr. Mansfield to Clark and paid by Clark from July 1999 through March 2001 for the engineering work he had performed during that period for Clark, Judd and Kalos. R4, 11372-74; H.Tr., Sullivan, 11:224, 247-48. Clark paid Mr. Mansfield for the work he did for the Kalos and Judd, and, at least in the case of Judd, Clark invoiced Judd for these costs. H.Tr., Sullivan, 11:238.

Mr. Sullivan explained that Clark determined that all of Mr. Mansfield's "scope of work" should have been completed by March 1999 (but Clark chose to absorb the costs for 3 or 4 more months), and Clark "should have spent" \$30,000 or \$40,000 for Mr. Mansfield's work, and that Clark has "basically taken out about \$80,000 for that work and said, 'We're going to eat 80,000 and say that was our base contract requirement.'" H.Tr., Sullivan, 11:224-25. Putting it another way, Mr. Sullivan explained, "I think the way we worked this out is we took the total cost, we factored out approximately 75-80 thousand dollars of up-front costs to Mansfield, and the rest from July forward was put in this change." *Id.* at 11:248. Thus, Clark's essential claim here is that the amount claimed represents a reasonable estimate of the excess costs incurred by Clark for Mr. Mansfield's services that were attributable to the defective and incomplete designs.

Mr. Mansfield started work on the project by performing a purlin survey from October 1998 to January 1999, for which there has been no argument that it was impacted by defective or incomplete designs. R4, 11370; H.Tr., Sullivan, 11:222-23. From February 1999 through March 2000, Mr. Mansfield prepared the shop and coordinated drawings for Kalos' underground air

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<sup>249</sup> The contract also contained a provision for the contractor employing a CPM consultant with certain minimum qualifications, at the contractor's expense, to provide CPM services. A4, K0099-100.

<sup>250</sup> Although the contract contemplates that the baseline schedule would form the basis for requests for contract extensions, the record contains no evidence of the relationship of the BGR and baseline schedule or that the BGR schedule reasonably supported Clark's delay claim. (The BGR schedule and updates have not been provided as part of the record.) We note that Clark's and Peterson Barrington's analysis, on which Clark bases its delay claim in the appeal, is based upon a comparison of the as-built schedule to the contractually approved baseline schedule, not on any use of the BGR schedule. Indeed, as was recognized by the approaches of both scheduling experts in this appeal, the basic techniques to be used in evaluating delay claims are either to maintain up to date CPM updates to the approved CPM schedule (not done here, particularly after the approved schedule was abandoned by Clark in favor of the BGR schedule) or to compare the as-planned CPM schedule with the as-built CPM schedule. See Wickwire, Hurlbut & Lerman, *Use of Critical Path Method Techniques in Contract Claims: Issue and Developments, 1974 to 1988*, 18 Pub Cont. Law J. at 341, 373.

duct work, apparently because Kalos declined to perform this work. R4, 11370; H.Tr., Sullivan, 11:223-24, 250; Mansfield 11:256. According to Mr. Mansfield, the underground air duct shop and coordinated drawings took much longer to prepare than anticipated because of various design issues, some of which involved the submission of RFIs. R4, 11370. From July 1999 through April 2000, Mr. Mansfield worked on the electrical shop and coordination drawings, which took longer than anticipated because of the congested areas in the facility, slow responses to RFIs, and lack of consistency between the design drawings. R4, 11370-71; H.Tr., Sullivan, 11:249-50; Mansfield, 11:256. From February 2000 through November 2000, Mr. Mansfield worked on landscape and exhibit plan issues, which apparently involved design issues concerning the location of the air duct system. R4, 11371; H.Tr., Sullivan, 11:227; Mansfield, 11:260-61. Mr. Mansfield also performed various other engineering tasks, such as providing designs for the fin tube radiation system connection and ladder relocations, and assisting in working out subcontractor installation problems. R4, 11371.

As illustrated by the examples cited by Mr. Mansfield, the record evidences that at least a portion of his work was impacted by defective and incomplete designs. H.Tr., Mansfield, 11:254-55, 260-62; R4, COF 2071-72. However, the record also shows that much of Mr. Mansfield's work was to support Clark, Judd and Kalos in fulfilling their contract requirements, for example, the requirement that coordination and as-built drawings be prepared, R4, K0092-93, determining how the fin tube radiation system should be attached (the claims associated with this issue are discussed below (*e.g.*, Clark Change Order No. 810401) where we found these were Clark's responsibility), and working out subcontractor installation problems. R4, 11370-71; H.Tr., Sullivan, 11:223, 244-47.

The only support (besides the anecdotal testimony of Mr. Sullivan and Mr. Mansfield) submitted by Clark in support of this claim was a Clark computer printout showing the total invoices paid to Mr. Mansfield from July 1999 through March 2001. However, Mr. Mansfield maintained a daily log for the project (reportedly 65 pages long), examples of which have been provided by AOC (obtained during discovery), which details Mr. Mansfield's daily work; Mr. Mansfield apparently provided pertinent pages of this log in support of his invoices (not provided by Clark in support of its claim), which apparently Clark then used at least for the purpose of determining how much to bill Judd for Mr. Mansfield's services. R4, 11371; Resp. Exhs. 14-17 Clark chose not to submit this supporting documentation in support of its claim here.

While Clark indicates that it would be an "arduous" and possibly a fruitless task to analyze the supporting documentation, or to have specifically tracked Mr. Mansfield's time, to determine how much of Mr. Mansfield's time was related to design issues for which AOC was responsible, App. Reply Brief at 96; H.Tr., Mansfield, 11:282; Sullivan, 11:225, we note that Mr. Mansfield was a single individual who tracked his own time in a daily log. Thus, if Clark believed that his work was primarily caused by defective and incomplete designs (as it contended early in the project), we do not think it would be an unreasonable burden for Mr. Mansfield and Clark to track the hours for which Clark asserts AOC should be responsible if Clark expected to be reimbursed for these costs.

We also note that although Mr. Sullivan testified that he did not believe that Mr. Mansfield's costs, all of which have been paid by Clark, were included in the change order claims, H.Tr.,

Sullivan, 11:227, we note that in several Judd change claims (*e.g.*, Clark Change Order No. 810233), Mr. Mansfield's costs were included. *See* H.Tr., Mansfield, 8:88. We think that to the extent Mr. Mansfield's labor costs were for particular defective or incomplete designs or contract changes, Clark should have tracked and included these costs as separate change claims. In fact, in Clark Change Order No. 810408 (decided below), Clark did track Mr. Mansfield's time and recovered his costs as part of a change claim.

The simplistic methodology proposed by Clark of holding AOC accountable for all costs after July 1999 is too unreliable to form a legitimate basis to award costs on the theory advanced by Clark here. Mr. Mansfield's time, both prior to and after that date, involved some work that only fulfilled Clark's contract requirements. There was no reliable testimony or other evidence that estimated the time spent by Mr. Mansfield in working on problems that were AOC's responsibility as opposed to fulfilling Clark's contract responsibilities. We do not credit Mr. Sullivan's unsupported assumption that every cost beyond \$75,000 to \$80,000 was AOC's responsibility; this approach is akin to a total cost approach in a situation where costs could have been tracked and where there is no evidence showing that Clark's estimate of Mr. Mansfield's costs was reasonable.

Under the circumstances, while there is evidence that indicates that some of Mr. Mansfield's time was caused by defective or incomplete designs, we have no basis to determine, even by a jury verdict method, the amount of those damages because the evidence adduced is not sufficient for us "to make a fair and reasonable approximation" of the damages. *See WRB Corp.*, 183 Ct. Cl. at 425. Thus, we deny this change claim.

#### **I. Palm House Structural Aluminum Repairs, Clark Change Order No. 810298**

Clark seeks an equitable adjustment in the amount of \$197,128 (not including Clark's markups) for repairs it and its subcontractors performed to the Palm House and monitor trusses as a result of the design deficiencies identified by SGH. App. Exhs. 103; 139, attach. 8. Specifically, as the Board finds above, there were a number of design deficiencies in the arch truss lacing angles, the monitor trusses, and ridge truss, for which AOC was responsible and which necessitated repair work by Clark and its subcontractors. However, as noted, the Board also finds that repairs Clark made to the intermediate lattice girders/tension rings were not shown to be necessary, and we deny the costs of these unnecessary repairs.

Although the contracting officer in his final decision on this change order found that Clark was entitled to \$59,176 for those repairs that Mr. Lakey, AOC's structural engineering expert, found to be necessary (that is, repairs to arch truss lacing angles and monitor trusses), COD, Palm House Structural Repairs, AOC, in its post-hearing arguments, contends that Clark is not entitled to any equitable adjustment because it was not directed by AOC to perform either the "comprehensive review" or the necessary repairs arising out of Clark's review. Resp. PFF part 2, tab II, at 4. As discussed above, the Board did not find that Clark acted as a volunteer in performing the repairs; rather, the Board found that Clark acted appropriately in undertaking to analyze the need for the repairs and performing the repair work, given AOC's actions and words, which reasonably led Clark to believe that it was Clark's obligation to perform these repairs which AOC itself had the duty and need to perform. Accordingly, consistent with the

contracting officer's final decision, the Board finds that Clark is entitled to recover the reasonable costs of making necessary repairs to the Palm House and monitor aluminum structure.

In its appeal, Clark sought \$466,533 (consisting of \$383,140 in Clark "self-performed" work and \$83,393 for Standard Iron work) as an equitable adjustment for this change order. *See* C4 Supp. 08 01140, 08 01154. With respect to Clark's claimed costs, DCAA questioned \$251,516 in costs associated with work performed by SGH that was already separately claimed by Clark, as well as the costs for the work associated with performing the butt weld repairs (which work was identified under a different Clark cost code).<sup>251</sup>

During the hearing, Clark modified its claimed costs for this change several times. Ultimately, Clark quantified its claims for this change as follows:

Lugmayer Associates	\$16,250
Paul G. Goodwin Welding	\$19,728
ATEC Industries, Ltd.	\$7,968
Quality Metal Works, Inc.	\$25,451
Clark	\$6,411
Accomodations	\$6,951
Equipment/Material	\$30,976
<b>Clark "Self-Performed Work" Total</b>	<b>\$113,735</b>
<b>Standard Iron Work</b>	
Williams Steel	\$24,299
Chattanooga Boiler & Tank	\$51,513
Standard Iron Profit (10%)	\$7,581
<b>Standard Iron Work Total</b>	<b>\$ 83,393</b>
<b>Total Without Clark's Markup</b>	<b>\$197,128</b>

See App. Exhs. 103; 139, attach. 8. In support of these claimed costs, Clark presented invoices, cost claim summaries, and other documentary evidence, *see* App. Exhs. 67, 103, and the testimony of Messrs. Dylus and Torchio. This evidence and testimony adequately documents Clark's claimed costs.

In this regard, Mr. Dylus testified, with respect to the "self-performed work," that he reviewed Appellant's Exhibit 103, including the invoices included with this exhibit, and reduced the amount claimed to reflect costs that were for repairing the butt welds (for which Clark does not contend AOC is responsible) and for services that were not part of the Palm House structural

<sup>251</sup> DCAA also questioned Standard Iron's application of a 10-percent profit/overhead on work performed by its subcontractors (Williams Steel and Chattanooga Boiler & Tank Company) because DCAA believed that Standard Iron's subcontract agreement with Clark precluded mark-ups for profit and overhead. DCAA Audit of Clark at 24-25. For the reasons detailed below, we find that Standard Iron's subcontract agreement with Clark did not preclude Standard Iron's application of profit/overhead mark-up on Standard Iron's subcontractors' work.

repairs. In this regard, Appellant's Exhibit 103 contains Mr. Dylus's handwritten notations, indicating the reductions he made. H.Tr., Dylus, 22:154-55. In addition, Mr. Dylus removed the costs claimed for services provided by SGH, given that these costs were already claimed in Clark's claim above for excess design costs. *Id.* at 22:157. Finally, Mr. Dylus testified that he reduced the amount claimed for material and equipment to reflect the costs only associated with these repairs. *Id.* at 22:158. Based on Mr. Dylus's adjustments, Clark's claimed costs for the self-performed work associated with these repairs are now \$113,735. App. Exhs. 103; 139, attach. 8.

AOC questions \$30,976 for materials and equipment of Clark's total claimed costs for its self-performed work, arguing that these costs are undocumented and are based upon estimates. Resp. Reply Brief, part 5, tab X, at 73. However, we find from our review of the record, including Mr. Dylus's testimony, that these costs are adequately documented and reflect actual costs. Mr. Dylus testified that these costs were determined from Clark's construction cost summaries, which were attached to Appellant's Exhibit 103. H.Tr., Dylus, 22:155, 157-58. These construction cost summaries document the claimed costs by identifying dates, suppliers, invoice numbers and costs for each item of material or equipment used. *See* App. Exh. 103. Accordingly, we find that these costs are supported and reasonable.

Clark presented the testimony of Mr. Torchio with respect to its requested \$83,393 for Standard Iron's costs associated with these repairs. H.Tr., Torchio, 15:295-97. Mr. Torchio testified that the costs claimed for Standard Iron's work were based upon amounts paid to Standard Iron's subcontractors, Williams Steel and Chattanooga Boiler, and that, with respect to Chattanooga Boiler, these costs were fair and reasonable and that no costs were included for repairing the butt welds. *Id.*; *see* App. Exh. 67.

AOC questions the \$24,299 claimed for Williams Steel because this cost was not documented in an invoice and Mr. Torchio, unlike his testimony regarding the Chattanooga Boiler invoices, did not specifically testify that he had reviewed Williams Steel's invoices or that no part of the claimed costs for Williams Steel was for butt weld repairs. Resp. PFF, part 2, tab II, at 5. While it is true that Standard Iron's August 21, 2001 invoice to Clark for the lacing angle repairs only contains invoices from Chattanooga Boiler and not an invoice from Williams Steel, App. Exh. 67, the Williams Steel invoice for this work is otherwise contained in the record. *See* A4 Supp. R00694.<sup>252</sup> The number of labor hours claimed by Williams Steel in its invoice is substantiated by Standard Iron's Palm House Repair Summary, which shows that Williams Steel provided 262 labor hours between March 6 and 12, when it performed lacing angle repairs. *See* A4 Supp. R00693. This document also confirms that Williams Steel did not perform any of the butt weld repairs, which were performed by other firms between March 14 and 20. *Id.* We thus find that Williams Steel claimed costs here are adequately documented and allowable.<sup>253</sup>

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<sup>252</sup> This invoice documents that Williams Steel had labor costs of \$13,787 (262 labor hours at \$52.62 per hour), equipment costs of \$8,113 ("A.C." welding machine (6 pack setup), control boxes, spoon gun wire feeders, welding lead and cables), and consumable material costs of \$2,399. A4 Supp. R00694.

<sup>253</sup> We note that DCAA, in its audit of Standard Iron's claimed costs, did not question the costs claimed for Williams Steel or Chattanooga Boiler.

Although we find that Clark is entitled to an equitable adjustment for repairs performed on the Palm House and that Clark has adequately documented its costs, Clark's claim here includes costs for repairing the intermediate lattice girder/tension ring (SGH sketches 5R and 6R). As discussed above in the Period 4 delay section, these repairs were unnecessary. We find that Clark is not entitled to recover the costs associated with performing these unnecessary repairs.

The record establishes that repairs to the intermediate lattice girder/tension ring were performed between March 24 and March 28 by Clark, ATEC, and Chattanooga Boiler. See A4 Supp. R00693. Specifically, Clark itself provided two laborers on March 24, who each worked 10 hours for a total of 20 labor hours; ATEC provided two laborers who worked 13 hours per day on March 24 through 27 for a total of 104 labor hours, and Chattanooga Boiler provided between two and four laborers (depending upon the day) who worked between 13 and 14 hours per day (depending upon the day) on March 24 through March 28 for a total of 186 labor hours.

We calculate the costs associated with these hours for Clark and ATEC by using the regular and overtime labor rates that these firms applied in their claim for these costs. See R4, COF 0711, 0712, 0721. With respect to Chattanooga Boiler, whose invoices claimed a number of hours at various labor rates, we calculate a weighted labor rate from its invoices and apply that weighted rate against the number of hours that firm incurred in performing the unnecessary repairs. See App. Exh. 67. Based on the foregoing, we calculate that Clark and Standard Iron's cost claim included \$23,329 for the costs of performing the unnecessary repairs on the intermediate lattice girder/tension ring, calculated as follows: Clark's costs of \$1,270 ((16 hours x \$60 = \$960) + (4 hours x \$77.50 = \$310)) plus ATEC's costs of \$7,620 ((40 hours x \$135 = \$5,400) + (12 hours x \$185 = \$2,220) plus Chattanooga Boiler's costs of \$13,126 (186 hours x \$70.57).

Taking into account the costs for unnecessary repairs, we find that Clark is entitled to recover \$104,845 for its own work on this change claim and that Standard Iron is entitled to recover \$68,955 for its change claim here, which we calculate as follows:<sup>254</sup>

<b>Clark "Self-Performed Work" Total</b>	<b>\$104,845</b>
Lugmayer Associates	\$ 16,250
Paul G. Goodwin Welding	\$ 19,728
ATEC Industries, Ltd.	\$ 348
Quality Metal Works, Inc.	\$ 25,451
Clark	\$ 5,141
Accomodations	\$ 6,951
Equipment/Material	\$ 30,976
<b>Standard Iron Work Total</b>	<b>\$ 68,955</b>
Williams Steel	\$ 24,299
Chattanooga Boiler & Tank	\$ 38,387
Standard Iron Markup (10%)	\$ 6,269

<sup>254</sup> For the reasons stated above, our determination here does not take into account the \$59,176 the contracting officer's decision found should be recovered under this change.

## J. Garden Court Pool Revisions, Clark Change Order No. 810191

### 1. Background

Clark claims an equitable adjustment of \$77,203 (here including Clark's markups) for rebuilding the pools in the Garden Court in accordance with a change order issued by AOC.<sup>255</sup> App. PFF ¶¶ 516-20. AOC had previously denied any liability for damages because the "Contractor has not considered the value of removing the pools during construction nor applied realistic credits for work no longer required." COD, Garden Court Pool Revisions. AOC now asserts that Clark's equitable adjustment for this change should be \$36,863. Resp. PFF part 6, tab II, at 3.

The originally existing Garden Court contained two concrete pools, for which the contract required Clark to perform only minor modifications, although, according to Clark, the pools were in poor condition. H.Tr., Sullivan, 1:19-20. In June 1999, after making some inquiries of AOC, Clark decided to demolish the Garden Court pools and to rebuild them. H.Tr., Sullivan, 1:27. After the demolition of the pools, but before Clark had rebuilt the pools, AOC issued Change Order No. 89 on April 26, 2000, requiring Clark to build the Garden Court pools in accordance with attached drawings, which included features that were in addition to and/or differed from the originally existing Garden Court pool design. R4, COF 2196. For example, whereas the old pools were essentially a three-sided concrete trough that sat on the ground, the new pools have "an extensive footing system" that required excavation and a greater volume of concrete. In addition, unlike the existing pools, the new pools were waterproofed and have tile throughout, as well as lights and fountains. H.Tr., Sullivan, 1:28; Mansfield, 1:93-94.

### 2. Clark's Claim

Clark states that its cost to build the new Garden Court pools under Change Order No. 89 was \$80,055, which it calculated as follows:

Judd	\$32,049
Clark Concrete <sup>256</sup>	\$21,098
David Allen	\$18,215
ARC	\$7,900
Kirlin	\$3,033
Lorton	<\$2,240>
<b>Total</b>	<b>\$80,055</b>

App. PFF ¶ 519.

<sup>255</sup> Because this claim involved both increased and decreased costs and multiple subcontractors, we will include Clark's markup in determining the amount recoverable for this change, and let Clark and its subcontractors decide how this amount should be allocated among them.

<sup>256</sup> Clark stated in its post-hearing brief that the Clark Concrete's costs were \$22,098, *see* App. PFF ¶ 519, but these costs were actually \$21,098. R4, COF 2111. Clark's \$80,055 total is based on the \$21,098 figure.

Against these increased costs, Clark applied a net credit of \$9,870 for its estimated costs of demolishing the pools and rebuilding them as originally designed. Clark's calculated this credit by adding Clark's estimated demolition costs of the existing pools (\$8,950)<sup>257</sup> to the estimated concrete costs to rebuild the basic concrete pools (\$13,200),<sup>258</sup> and subtracting from this sum the costs of its subcontractors (Kirlin, David Allen, and Kalos) (\$12,280) for work that was no longer necessary because the pools were rebuilt. App. PFF ¶ 17. Although not clearly articulated by Clark, it appears that Clark's theory in using this methodology is that demolishing the pools and rebuilding them was its intended performance of the contract, and therefore, when AOC ordered a new pool design that made rebuilding the pools unnecessary, Clark saved these estimated costs of performing in Clark's originally planned manner.

Clark also requests its 10-percent markup on the net amount of \$70,185 (\$80,055 - \$9,870) for a total change claim of \$77,203.

### 3. AOC's Position on Claim

AOC contends that Clark was not entitled to remove the Garden Court pools under the contract and that the demolition of the pools resulted "in less work being required of Appellant under the contract." AOC argues that Clark is entitled to an equitable adjustment for the new pool's "extra work" (\$134,897), less the cost of removal and replacement of the existing pools (\$68,034), less an additional \$30,000 that Clark assertedly saved by not having to perform the original contract work. Thus, AOC calculated the equitable adjustment as \$36,863. Resp. PFF, part 6, tab II, at 3.

AOC's position is primarily based upon an estimate prepared by AOC's construction cost estimating and pricing expert, Neil Sinclair. Resp. Exh. 1. This estimate concluded that the cost to build the new pools per Change Order No. 89 is \$134,897 and that the estimated credit for rebuilding the existing pools is \$68,034. *Id.* AOC has provided no evidence supporting the additional \$30,000 credit.

### 4. Demolishing the Pools

Clark argues that "as the contractor, [it] is entitled to select and use its own means and methods," and that Clark elected to demolish the original pool and replace it as the better means of performing the contract work. App. PFF ¶ 510. Clark contends that it notified AOC of its plan on April 22, 1999, prior to the demolition of the pools, and asserts that AOC never challenged Clark's planned means and methods. *See* App. Exh. 1; H.Tr., Sullivan, 1:22.

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<sup>257</sup> Although, in calculating the credit to which Clark believed AOC would be entitled for deleted work, Clark included estimated costs of \$8,950 for ARC's demolition of the pools, Clark's claim to build the pools was based on ARC's actual demolition costs of \$7,900.

<sup>258</sup> We note that Clark's calculation of the amount needed to rebuild the concrete pools does not include various other costs that would seem to be required, for example, the band of tile that was in the original pools. *See* H.Tr., Sullivan, 1:20.

However, contrary to Clark's apparent belief that the contract permitted it to demolish the existing Garden Court pools, the contract clearly contemplated that the contractor would retain the pools. In this regard, Drawing A010, Architectural Demolition Floor Plan, shows no such demolition was contemplated. In addition, detail 21/L101 on Drawing L302 informed the contractor that the "interior pool surface [was] to remain undisturbed, clean only," and detail 14/L101 of this drawing required the contractor to "carefully remove & replace top 6" facing tile, match existing mortar color, new tile to match existing tile." Clark apparently recognized these contract requirements during contract performance, when it wrote AOC "[p]lease be advised that the concrete pools were not shown on the contract drawings as being removed." R4, COF 2222. Moreover, it appears that Clark's April 22, 1999 transmittal to AOC, rather than being notice to AOC that Clark would be demolishing the pools, was a change proposal to do this work. App. Exh. 1. In this regard, Mr. Sullivan testified that, although AOC did not respond in writing to this transmittal, it was "talked about at some owner's meeting, and they didn't seem interested in changing the pools or getting any additional benefit from it." H.Tr., Sullivan, 1:26.

The Board also finds no support for Clark's contention that it was always the contractor's intention to demolish the Garden Court pools and rebuild them. See H.Tr., Sullivan, 1:21. In this regard, we note that Mr. Sullivan was not involved with this project until after the contract was executed and testified that he was not involved in the "bidding process." See H.Tr., Sullivan, 1:64, 12:160, 13:125. Moreover, his testimony is belied by Clark's April 22, 1999 transmittal to AOC, when Clark asked AOC to pay Clark an additional \$10,000 for the demolition and rebuilding of the pools. App. Exh. 1; H.Tr., Sullivan, 1:23. That document also evidences credits for subcontractor work that would not have been included in Clark's contract price, if Clark had always planned to demolish the pools; for example, Clark's transmittal provides a \$4,230 credit to Kalos for shoring and sheeting work that would be necessary only if the pools were retained. App. Exh. 1; see H.Tr., Sullivan, 1:21-22, 25.

In June of 1999, Clark demolished the Garden Court pools. H.Tr., Sullivan, 1:27. While Clark may have decided to use this "means and methods" of performing the contract, we find that this was action was unauthorized and that Clark's demolition of the pools was a unilateral decision to destroy structures that the contract contemplated would be retained.

#### **5. Change Order No. 89**

On April 26, 2000, AOC issued Change Order No. 89, expressly directing Clark to build new Garden Court pools in accordance with a new government design. R4, COF 2196. There is no disagreement that the new pool design required Clark to perform additional and/or different work than was required under the original contract requirements. As noted above, the existing pools were essentially three-sided concrete troughs that sat on the ground, while the new pools have "an extensive footing system," requiring excavation, are waterproofed, and have tile throughout, as well as lights and fountains. H.Tr., Sullivan, 1:28-29; Mansfield, 1:93-94. In addition, there was other contract work included in Clark's contract price that did not have to be done because the existing Garden Court pools were demolished: that is, costs for Lorton to install the frog fountains, for Kirlin to perform drilling and coring associated with piping for the frog fountains, for David Allen for removal of and remedial work for the band of tiles, and for Kalos for

sheeting and shoring to allow Kalos “to get his underground pipework system below those pools.” H.Tr., Sullivan, 1:20-26.

## 6. Equitable Adjustment under Changes Clause

Under the Changes clause incorporated in this contract, an equitable adjustment to the contract price is to be made where a change causes “an increase or decrease in the Contractor’s cost of, or the time required for, the performance of any part of the contract work under this contract.” FAR § 52.243.4 (Aug. 1987). The well established test to determine equitable adjustments for changes is the difference between what it would have reasonably cost to perform the work as originally required and what it reasonably cost to perform the work as changed. *Santa Fe Eng’rs, Inc.*, ASBCA No. 48331, February 9, 1995, 95-1 BCA ¶ 27,505 at 137,076. In determining the proper equitable adjustment for a change order, it is Clark’s burden of proving the amount of an upward adjustment for changed or added work, and it is AOC’s burden of proving the amount of the downward adjustment for deleted work. *Nager Elec. Co. v. United States*, 194 Ct.Cl. at 853; *F.E.I.*, ASBCA No. 45935, March 31, 1995, 95-2 BCA ¶ 27,613 at 137,628.

As indicated, the record shows that Change Order No. 89 resulted in both increases and decreases in Clark’s costs associated with performing the Garden Court pool work. We begin by addressing, by subcontractor, the increased costs to which Clark is entitled as part of the equitable adjustment. We will then address the decreased costs, for which AOC should receive a credit as part of the equitable adjustment.

## 7. Increased Costs

### a. Judd’s Costs

Change Order No. 89 added an electrical system and lighting that the original Garden Court pools did not have; Judd performed this additional work. H.Tr., Sullivan, 1:29; Mansfield, 1:93-96. Judd claims \$32,049 (which includes its profit and overhead markups) under this change. See R4, 7592.

In support of the Judd change claim, Appellant offered the testimony of Mr. Mansfield, who, without objection, was qualified and accepted by the Board as “an expert in civil engineering and also, having reviewed the documents, for his expertise to audit Judd’s scope of work as well as his costs.” H.Tr., Mansfield, 1:89-90. Mr. Mansfield testified that he observed Judd performing the Garden Court pool electrical work, which included installing underwater lighting fixtures, waterproof receiving boxes, and underground piping and “running conduit to a rather remote location in the mezzanine . . . above the main entrance to the building, and adding a new circuit to an existing panel or a panel that was already being furnished.”<sup>259</sup> *Id.* at 1:95-96.

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<sup>259</sup> Although AOC suggested during the hearing that Truland, rather than Judd, may have performed this work, see H.Tr., 1:75-76, AOC has not offered any rebuttal to Mr. Mansfield’s testimony that he observed Judd performing the Garden Court pools electrical work. H.Tr., Mansfield, 1:94-95, 102.

During the contract, Mr. Mansfield, among other things, assisted Judd in pricing change order work. *Id.* at 1:87-89. He testified that Judd, like other electrical contractors with which Mr. Mansfield was familiar, did not track actual costs for performing individual change order work, because Judd's focus was to make the work flow in a logical sequence for the total project and it did not have the staff to track costs for individual change orders on a project of this nature. *Id.* at 1:97-98, 103. He also explained that Judd estimated its costs based upon a takeoff analysis of the drawings,<sup>260</sup> and using a software program implementing National Electrical Contractors Association (NECA) rates, which are generally accepted "as being a good source of electrical estimators' costs."<sup>261</sup> H.Tr., Mansfield, 1:88-89, 99, 105.

Mr. Mansfield testified that he reviewed Judd's \$32,049 estimate for performing the Garden Court electrical work,<sup>262</sup> and stated that much of the estimate "is generated as the result of the input of, say, the distance from the Garden Court pool up to the electrical panel. If you measure that distance, then you know the size of the circuit that is required." *Id.* at 1:98-99, 105. In this regard, Mr. Mansfield further explained that in reviewing Judd's estimate for this work, which he found fair and reasonable, he performed his own takeoff analysis of the change based on the drawings in determining the reasonableness of Judd's estimate, for example, he calculated the length of conduit required back to the electrical panel. *Id.* at 1:99, 105.

AOC has offered the testimony of Neil Sinclair, who without objection from Clark, was qualified and accepted by the Board as an expert in the field of construction estimating and pricing. H.Tr., Sinclair, 1:110-11. Mr. Sinclair estimated that a fair and reasonable cost for the electrical work per Change Order No. 89 was \$23,806. Resp. Exh. 1 at GCP 9-10; H.Tr., Sinclair, 1:122. Mr. Sinclair testified that to calculate his estimated electrical costs he counted the number of lights in the pool and "estimated the conduit to get back to the home runs," and that his estimate included both material and labor. H.Tr., Sinclair, 1:131-34.

From our review of the testimony of the parties' pricing experts, we find Mr. Mansfield's testimony to be more reliable than Mr. Sinclair's. In addition to his established expertise, Mr. Mansfield had specific experience helping Judd price change order work, and provided fairly

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<sup>260</sup> As detailed below in discussing the estimates on which Kirilin based its change claims, a takeoff is an analysis of the contract and change drawings by an estimator who determines the amount of the material components of the change. See H.Tr., Hahr, 6:33-35. The results of the takeoff determine "labor units," that is, time measures of how long it takes to install the particular component, as designated in a labor pricing book or manual, such as NECA's. *Id.* at 6:37-38, 73-75. These labor units are then multiplied by the appropriate component quantity to estimate how many labor hours that it will take to install each component, and these amounts are totaled to determine the total labor hours necessary to accomplish the change. *Id.* at 6:38-39, 44.

<sup>261</sup> NECA, an association of electrical contractors in the United States, publishes standards for performance of electrical work, which are well known to the construction industry personnel and are regularly used by electrical contractors in pricing electrical work. See *Centex Bateson Constr. Co., Inc.*, VACAB Nos. 4613 *et al.*, December 3, 1998, 99-1 BCA ¶ 30,153 at 149,196.

<sup>262</sup> This estimate provides a breakdown of Judd's material and labor costs to perform the work. R4, 7594-95.

detailed testimony explaining his methodology that found Judd's cost estimate to be fair and reasonable.

In contrast, although we accept Mr. Sinclair's expertise in construction pricing and estimating, Mr. Sinclair was unable in his testimony to identify the labor and material components of his electrical work estimate for this change. H.Tr., Sinclair, 1:133-34. His written estimate also failed to individually identify labor and material costs. Resp. Exh. 1 at GCP 9-10. Also, Mr. Sinclair was unable to identify with any specificity what pricing data he used to estimate the material costs for this work. H.Tr., Sinclair, 1:132.

In sum, we find Mr. Mansfield's testimony satisfied Appellan's burden of establishing the increased costs to which Judd is entitled as an equitable adjustment for the additional electrical work under Change Order No. 89, and find that Judd is entitled to recover \$32,049 for performing the additional electrical work under this change.

#### b. Clark Concrete Costs

Change Order No. 89 provided a revised design for the Garden Court pools that had "an extensive footing system," requiring excavation and more concrete work than that of the original Garden Court pools. H.Tr., Sullivan, 1:28-29; Mansfield, 1:93-94. In contrast, the original Garden Court pools did not have footers and did not require excavation. H.Tr., Sullivan, 1:28.

Although the parties disagree in a number of regards with respect to the concrete work performed by Clark Concrete, we need not resolve these disputes.<sup>263</sup> That is, notwithstanding that Clark provides inadequate support for Clark Concrete's \$21,098 (including markups for profit and overhead) change proposal, which is based on estimated rather than actual costs, R4, COF 2111, this amount is less than the \$29,428 (without markups) that Mr. Sinclair estimated would be a fair and reasonable price for the Clark Concrete work. See Resp. Exh. 1 at GCP 9.

Thus, we will use Clark Concrete's lower estimate as the basis for determining the value of the Clark Concrete work for this change. However, for the reasons stated below, because Clark Concrete is a wholly owned subsidiary of Clark, we do not allow its overhead and profit markups, which total \$3,661. Accordingly, the Board finds that Clark Concrete is entitled to recover \$17,437 under this change claim.<sup>264</sup>

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<sup>263</sup> For example, Mr. Sinclair testified that he did not believe that Clark provided the footers that the Change Order No. 89 drawings showed. H.Tr., Sinclair, 1:135-36. This belief was based upon Mr. Sinclair's review of a photograph of the completed pools and a conversation with Roy Coffey of DMJM where Mr. Coffey reportedly stated that Clark did not construct the underground footers. *Id.* at 1:137. Mr. Sinclair did not explain, however, how Mr. Coffey (who did not testify although he was present at the hearing) knew that the work was not performed, and in this regard Mr. Sinclair also testified "nobody really knows what was built." *Id.* at 1:137, 148. In contrast, Mr. Sullivan testified from personal knowledge that he saw the excavation for and pouring of the footers required by the revised contract drawings. H.Tr., Sullivan, 1:154-55.

<sup>264</sup> \$21,098 - \$3,661 = \$17,437.

### c. David Allen Costs

Change Order No. 89 provided for waterproofing of the pools and for full lining of the interior walls and floor surface of the pools with tile, whereas the original design did not require waterproofing and only had a single band of tile at the water line. H.Tr., Mansfield, 1:93. David Allen's claim includes \$16,239 in increased costs (not including its overhead and profit markups) for the waterproofing of the pools and the provision of tiles.<sup>265</sup> R4, COF 2116. Here too, Clark provided little support for David Allen's claimed amount, other than David Allen's written estimate; in fact, the evidence offered by Clark by itself was not sufficient to support recovery of this change claim based on estimated costs.<sup>266</sup> See *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321. However, Mr. Sinclair estimated that \$15,444 (without markups) would be a fair and reasonable price for the tile and waterproofing work performed by David Allen. Resp. Exh. 1 at GCP 9. Thus, we will use Mr. Sinclair's lower-priced estimate to determine the value of David Allen's work and apply that firm's 10-percent overhead and 10-percent profit markups. Thus, we find that David Allen is entitled to recover \$18,687 for this change claim (not counting any credits that David Allen may owe (discussed below)).<sup>267</sup>

### d. Kirlin Costs

Change Order No. 89 added fountain and plumbing work that was not part of the original design. Kirlin requests an equitable adjustment of \$3,033 (with markups) for the installation of the fountains and associated plumbing by Kirlin. R4, COF 2124. Here too, Appellant provided little substantiation for this claimed amount, which is based upon Kirlin's estimated costs. However, Mr. Sinclair estimated that \$5,000 (without markups) would be a fair and reasonable price for the increased fountain and plumbing work provided by Kirlin. Resp. Exh. 1 at GCP 9. Since Mr. Sinclair's estimate exceeds Kirlin's estimate, we will determine the amount recoverable here based on Kirlin's estimated costs.

As discussed in detail below, we find certain parts of Kirlin's estimates are not reasonable and recoverable. Specifically, for the reasons detailed below, we do not allow here Kirlin's drayage and material markups totaling \$102; quality control and safety labor costs totaling \$85; craftsman labor costs that we found overstated by \$105 or 10 percent, because they apparently did not account for apprentice labor; and \$48 in costs for unproductive foreman labor hours exceeding 10 percent of the total craftsman hours--the unallowable costs total \$340. R4, COF 2124. We subtract \$340 from Kirlin's direct costs of \$2,507 to find the total allowable estimated direct costs of Kirlin for this change claim to be \$2,167. *Id.* After applying Kirlin's

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<sup>265</sup> Clark actually claimed \$18,215 (including David Allen's markups) based upon that subcontractor's June 7, 2000 claim letter. See R4, COF 2116. That claim, however, shows credits totaling \$1,185 for the original tile work that would not be performed and increased costs totaling \$16,239, which figure we will use for purposes of our discussion here. We will separately deal with David Allen's credits for deleted work below.

<sup>266</sup> Clark merely provided the conclusory testimony of Mr. Sullivan that David Allen's claimed amount was fair and reasonable. H.Tr., Sullivan, 1:31.

<sup>267</sup> \$15,444 + \$1,544 (overhead) + \$1,699 (profit) = \$18,687.

overhead and profit markups to this figure, we find that Kirlin is entitled to recover \$2,622 for this change claim (not accounting for any credits that Kirlin may owe (discussed below)).<sup>268</sup>

e. ARC Costs

Clark also requests on behalf of ARC that firm's costs totaling \$7,900 for demolishing the original Garden Court pools. App. PFF ¶ 519; R4, 7592. We find that Clark/ARC is not entitled to an equitable adjustment for the costs of demolishing the pools, since this was not permitted by the contract and was not authorized or directed by AOC. The Changes clause provides for an equitable adjustment for changes caused by the government. Here, the demolition of the pools was not ordered, expressly or constructively, by AOC. In fact, the record establishes that, prior to demolishing the pools, Clark asked AOC to pay it to demolish the pools, and AOC indicated that it was not "interested." See H.Tr., Sullivan, 1:26. While it appears that the work ordered by Change Order No. 89 could not be performed without demolishing the pools, see R4, 7649-50 (in which Mr. Mansfield wrote to Clark that work ordered by Change Order No. 89 would not be possible without replacing the pool structures), the fact is that the pools were demolished nearly a year prior to the issuance of the change order.<sup>269</sup> We thus deny ARC's change claim for the pool demolition costs.

f. Summary of Increased Costs

In sum, the Board finds that the increased costs attributable to this change total \$70,795, which we calculate as follows:<sup>270</sup>

Judd	\$32,049
Clark Concrete	\$17,437
David Allen	\$18,687
Kirlin	\$2,622
<b>Total Increased Costs</b>	<b>\$70,795</b>

<sup>268</sup> \$2,167 + \$217 + \$238 = \$2,622.

<sup>269</sup> The parties have not argued or addressed whether the issuance of Change Order No. 89 ratified Clark's unauthorized demolishing of the pools. We find that the record does not show that the change order ratified Clark's actions. Not only has Clark not presented or elicited any testimony to show any such ratification, but AOC contends that the pools were not to be removed because "of the historic nature of the structure." See Resp. PFF, part 6, tab II, at 6. Indeed, as noted above, in response to Clark's request that AOC pay Clark to demolish the pools and rebuild them, AOC made it clear that it was not interested. H.Tr., Sullivan, 1:26.

<sup>270</sup> In its calculation of increased change order costs, Clark included a \$2,240 credit from Lorton for the frog fountains that were originally to be installed but which Change Order No. 89 deleted. We deal with this credit below as part of the decreased costs.

## 8. Decreased Costs

The parties agree that AOC should be entitled to a credit based on Clark's estimated costs of demolishing and rebuilding the Garden Court pools as originally designed, although the parties' estimates of the amount of this credit vary. As indicated above, Clark's offer to credit AOC for the costs of rebuilding the pools and its estimate for demolishing them is seemingly premised upon Clark's theory that demolishing and rebuilding the pools was part of Clark's "means and methods" of performing the contract. However, as noted above, we found that Clark was not permitted under the contract to demolish and rebuild the pools. AOC does not explain the basis of its position that Clark should credit AOC for the cost of demolishing and rebuilding the pools.

We find no basis in the Changes clause to determine the credit as proposed by the parties. As noted above, the pools were not in fact rebuilt to the original design, but were built to a new design provided by Change Order No. 89, and the new design provided by this change order was not merely an upgrade to the original pool structure, but would have required the replacement of the original pools. The Changes clause provides for an equitable adjustment for increases or decreases in contract costs ordered, expressly or constructively, by the government. Here, the estimated costs of demolishing and rebuilding the pools were not, and could not be, part of Clark's contract price, since this approach was inconsistent with the terms of the contract. Therefore, we reject the parties' methodologies for determining the credit due the government under this equitable adjustment claim.

However, the record shows that Clark had decreased costs of contract performance because of Change Order No. 89 that must be credited the government, recognizing, however, that it is AOC's burden to show the reasonable amount of the credit. *See Nager Elec. Co. v. United States*, 194 Ct.Cl. at 853; *F.E.I., supra*, at 137,628. Specifically, Mr. Sullivan testified that the contract required Clark to add frog fountains to the Garden Court pools, which would require some drilling and cutting; to do some removal of and remedial work associated with the existing band of tile on the pools; and to support work, such as sheeting or shoring, under the pools to allow for subsurface work under the pools. H.Tr., Sullivan, 1:20, 23-26. Clark ultimately performed none of this work.

Clark agrees that the costs of the frog fountains, which were expressly deleted by Change Order No. 89, should be credited to AOC, and accordingly, decreased its equitable adjustment claim by \$2,240 to reflect its subcontractor Lorton's decreased costs to provide the frog fountains. *See App. PFF ¶ 519; R4, 7610*. Also, as noted above, the record evidences that Clark's contract price included \$6,200 to have Kirlin perform the drilling and coring associated with installing the frog fountains, \$4,230 to have Kalos do the necessary shoring under the pools, and \$1,850 to have David Allen perform the remedial tile work.<sup>271</sup> H.Tr., Sullivan, 1:23-26; App. Exh. 1; R4, COF 2105, 2106, 2218. Clark made the performance of this work unnecessary when it unilaterally decided to destroy the pools rather than retain them as required by the contract. Clark's actions, as ultimately recognized by AOC by the issuance of this change order, changed the contract in a manner that resulted in some decreases in Clark's costs of performance.

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<sup>271</sup> Mr. Sullivan was unwilling to concede that estimated costs of this unperformed work should be credited to AOC. *See H.Tr., Sullivan, 1:56*.

Although there is little support for these subcontractors' offered cost credits, AOC has not argued that any of these costs are understated.

In sum, we conclude that the total credits or decreased costs due AOC for determining this equitable adjustment are \$14,520, which we calculate as follows:

Lorton	\$ 2,240
Kirlin	\$ 6,200
Kalos	\$ 4,230
David Allen	\$ 1,850
<b>Total</b>	<b>\$14,520</b>

As indicated above, AOC argues that an additional credit should be taken in the amount of \$30,000, which AOC states represents "a fair and reasonable costs saving to the Appellant for being allowed to remove the two pools and, thereby, facilitate its subjaent work." Resp. PFF, part 6, tab II, at 3. It is true that if savings resulted from a change in contract specifications, the government should receive the benefit of these savings under the Changes clause. *George C. Punton, Inc.*, ASBCA No. 9767, July 23, 1965, 65-2 BCA ¶ 5007 at 23,607. However, AOC does not explain how it calculated, or what elements comprise, this \$30,000 claimed credit; nor has AOC provided any supporting evidence for this estimate.<sup>272</sup> Given the lack of support for this claimed credit, we find that AOC has not satisfied its burden of proving that this additional credit should be applied in determining the equitable adjustment.

## 9. Conclusion

We find that the increased costs as a result of this change total \$70,795 and the decreased costs total \$14,520. The net equitable adjustment for this change before applying the Clark markup is \$56,275.<sup>273</sup> The contract provides that "[o]n changes involving both an increase and a decrease in price, overhead and profit will be allowed only on the net increase." K0189. Applying this provision here, we find that Clark is entitled to an equitable adjustment of \$61,903.<sup>274</sup>

### K. East and West Display Hall Access Panels, Clark Change Order No. 810337

Clark claims \$2,025 for providing access panels that were installed in the ceilings of the East and West Display Halls.<sup>275</sup> R4, 11173; H.Tr., Sullivan, 5:53.

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<sup>272</sup> While we recognize that this \$30,000 figure was included in AOC's contemporaneous estimate when it issued Change Order No. 89, R4, COF 2087, we find nothing in the record that indicates how this figure was derived. In addition, we note that Mr. Sinclair provided no testimony supporting this credit.

<sup>273</sup> Because we are uncertain how the credited work should be accounted for by Clark, we will here apply Clark's markup and leave to Clark and its subcontractors the determination as to how they will allocate the total amount found recoverable here.

<sup>274</sup>  $\$56,275 + \$5,628 = \$61,903$ .

<sup>275</sup> Clark's claim initially included \$5,809 on behalf of John H. Hampshire to install these access panels. R4, 11163. That subcontractor elected not to pursue its claim. H.Tr., Sullivan, 5:134.

The contract drawings showed 6 access panels (typical) in each display hall. R4, Drawing A401. The contract specifications applicable to the installation of mechanical and electrical equipment required the installation of "access panel[s] or doors where units are concealed behind finished surfaces." R4, K0950, K1320. These specifications further state that "access panels and doors are specified" in the "Access Doors" section of the specifications. *Id.* The access door specification applies to "access panels for items of mechanical, plumbing and electrical work located behind or above finished walls or ceiling which require access, whether or not such panels are indicated on drawings." R4, K0643. The specified access doors are ordinary steel doors. R4, K0644; H.Tr., Sullivan, 5:50.

In the East and West Display Halls, a total of 20 access panels were necessary to be installed in the ceiling to provide access to the mechanical and electrical equipment. H.Tr., Sullivan, 5:50, 53; R4, 11173. According to Mr. Sullivan's unrebutted and credible testimony, AOC directed Clark to install "special" access panels in the East and West Display Halls. H.Tr., Sullivan, 5:50; *see* R4, COF 5349, 5358. These "special" panels had a recessed door, so that the same material in the surrounding ceiling could be put in the recess such that the panels would not be readily visible. H.Tr., Sullivan, 5:96.

AOC denied the claim on the basis that the specifications require access panels wherever necessary, notwithstanding the number of access panels shown on the drawings. COD, East and West Display Hall Access Panels. However, AOC has provided no evidence disputing Mr. Sullivan's account that AOC directed that these "special" access panels be utilized in the East and West Display Halls, instead of the ordinary access panels specified in the contract. AOC also does not dispute the reasonableness of the costs claimed by Clark, that is, \$101.25 per panel, which are supported by a vendor's invoice. R4, 11171, 11173. Thus, we find that Clark should be reimbursed for the costs of these "special" panels.

AOC points out that Clark has offered no credit for the regular panels that it would have installed pursuant to the drawings. However, AOC only noted this failure in its post-hearing brief and did not raise this defense prior to or at the hearing. Resp. PFF part 5, tab VII, at 2-3. As indicated, it is AOC's burden to show the appropriate deductive credit that would be due because of this change. *See Nager Elec. Co. v. United States*, 194 Ct.Cl. at 853; *F.E.I., supra*, at 137,628. However, AOC has presented no evidence that would suggest what credit is appropriate, and we find nothing in the record that would allow the Board to make this determination. In this regard, the record does not even indicate whether the "special" panels were more or less expensive than the contractually required panels. Accordingly, we apply no credit for the costs of the contractually specified panels in our equitable adjustment calculation.

In sum, we find that Clark is entitled to recover \$2,025 for this change claim.

#### **L. Palm House Level 4 Light Mounting Brackets, Clark Change Order No. 810340**

Clark claims \$7,257, based on asserted actual costs, for the installation and fabrication of light mounting brackets for eight lights on the level 4 catwalk in the Palm House. App. Exh. 23; H.Tr., Sullivan, 5:12, 18, 67, 135. The claim for this work was previously submitted on behalf

of Clark Concrete in the amount of \$3,985.<sup>276</sup> R4, 11192. The contracting officer's decision conceded liability, but only allowed \$3,985 (not counting Clark's markup) because Clark had provided no explanation for its \$7,257 claim. COD, Palm House Level 4 Light Mounting Brackets.

The \$7,257 claim purports to be based on Clark's actual accumulated costs for this work and is supported by a computer printout showing the costs assigned by Clark to this change.<sup>277</sup> App. Exh. 23; H.Tr., Sullivan, 5:15-16. While Clark does not always track its actual costs for changes, H.Tr., Sullivan, 5:153, this was Clark's "attempt" to do so for this change. *Id.* at 5:16. This printout showed 185.5 hours of Clark labor, including overtime hours, at a total loaded cost of \$4,856. App. Exh. 23; H.Tr., Sullivan, 5:16. The material costs on the printout totaled \$2,401 and included \$1,500 for its vendor Goodwin to "install light brackets" on the catwalk. App. Exh. 23; H.Tr., Sullivan, 5:17; R4, 11201.

The major difference between the claim presented to the contracting officer and that presented during this appeal is that the Clark Concrete claim only reflected 24 hours of labor (8 for an ironworker to fabricate the brackets, 8 for a lift operator and 8 for a painter), R4, 11193, as compared to the 185.5 labor hours now claimed. App. Exh. 23. As noted by AOC, this number of hours amounts to more than 23 hours of Clark labor to install and fabricate the brackets for each of the eight lights. Resp. PFF, part 5, tab VIII, at 2. In addition, as further noted by AOC, the Goodwin invoice was to "install [the] light brackets," R4, 11201, and Clark and Mr. Sullivan provided no testimony or evidence as to why so much labor was being charged to this change when the brackets were actually being installed by Goodwin. Resp. PFF, part 5, tab VIII, at 2. While Mr. Sullivan testified that most of the change work was done by Clark's own personnel, H.Tr., Sullivan, 5:12, he did not reasonably explain what work was performed by these individuals on this changed work, given that the record evidences that Goodwin was actually installing the brackets. Thus, notwithstanding Clark's assertion that this change claim is based on actual costs, we have no confidence here that the costs captured by Clark were properly assigned to this Clark change code.<sup>278</sup>

Under the circumstances, we find that Clark is entitled to only recover the \$3,958 allowed in the contracting officer's decision and we deny its request for additional costs beyond that amount.<sup>279</sup>

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<sup>276</sup> Mr. Sullivan explained that "there's a thin line between Clark Concrete and Clark Construction, but I was directing them I was paying the, it comes out of the same pot, if you will, it's just the only difference is the cost code that you would code they are paid with (sic)." H.Tr., Sullivan, 5:75.

<sup>277</sup> This printout was apparently not provided to AOC until the hearing.

<sup>278</sup> Mr. Sullivan's testimony indicated no personal knowledge as to how the labor costs were charged to this particular Clark change code. Instead, he generally explained how Clark's superintendents or foreman could charge labor to Clark change codes, although he believed that accurately reporting these labor hours was an "extremely difficult" task. H.Tr., Sullivan, 5:138-39

<sup>279</sup> As stated above, the costs allowed in the contracting officer's decision have not been paid.

### M. Infill at Radiator Cabinets, Clark Change Order No. 810303

Clark claims \$4,714 for filling with grout holes located behind the 24 runtal radiators in the Orangerie. App. Exh. 24; H.Tr., Sullivan, 5:20.

The affected runtal radiators were removed as part of the demolition of the project in early 1999. H.Tr., Sullivan, 5:79. The existing radiators were recessed in the walls by approximately a foot and a half, and each had a grill that covered the radiator that was enclosed in a sheet metal enclosure. *Id.* at 5:20, 77-84. When the radiators and their enclosures were being removed, it was discovered that there was asbestos in back of the enclosures that had to be abated. *Id.* at 5:20-21, 79.

According to Mr. Sullivan, Clark planned on removing the radiator enclosures by cutting or "burning" the anchors securing the enclosures to the wall. *Id.* at 5:20-21, 87. However, this plan became impractical when asbestos was discovered because of the sparks that could be created by cutting or burning the anchors. *Id.* at 5:87. Consequently, the asbestos abatement contractor had to physically tear out the enclosures. *Id.* at 5:88. The wall behind the enclosures was made of terra cotta and this more forcible removal of the enclosures damaged that portion of the wall-- damage that would not have occurred had Clark been able to implement its original plan for removing the enclosures. *Id.* at 5:21-22, 87-88.

Clark did not plan on patching the holes created by this removal because they were out of sight behind the radiators, but the DMJM site representative instructed Clark to patch these holes before installing the new radiators and reinstalling the refurbished grills. *Id.* at 5:21-22. Consequently, during the weeks ending January 28, February 4, and February 11, 2001, Clark patched the holes behind the 24 radiator openings with grout. *Id.* at 5:22, 25; App. Exh. 24.

On September 14, 2001, Clark submitted a claim on behalf of Clark Concrete in the amount of \$2,233 for this work based on estimated costs. R4, COF 5588; H.Tr., Sullivan, 5:25-26. The claim now presented in the amount of \$4,714 is on Clark's own behalf and is based on Clark's actual costs as charged to Clark change code No. 810303. App. Exh. 24; H.Tr., Sullivan, 5:27, 81. This claim reflects 180 labor hours (45 of which were overtime hours) for a total labor cost of \$4,306 and material costs of \$408 for grout. App. Exh. 24; H.Tr., Sullivan, 5:24.

AOC denied Clark's claim on the basis that Clark was responsible under the contract for patching the holes that would be expected by the removal of the radiators. COD, Infill at Radiator Cabinets; *see* R4, K0208. However, according to Mr. Sullivan's un rebutted testimony, this patching was only caused by the asbestos abatement activities because Clark's planned less-invasive means of removing the radiators would not have caused this damage. H.Tr., Sullivan, 5:21-22. While asbestos abatement was a contract requirement, R4 K0335, the area behind the radiators was not one of the designated areas for which Clark was contractually responsible for asbestos abatement. H.Tr., Sullivan, 5:23, 77. Indeed, the actual asbestos abatement here was part of a change order, for which Clark and its asbestos abatement subcontractor were compensated. *Id.* at 5:23. That change did not include these patching costs because they were incurred long after the asbestos abatement as Clark did not believe it would be required to patch the holes behind the radiators. *Id.*

AOC notes that Clark in its claim had not identified the removal of asbestos as being the reason the holes needed to be patched, and implies that this patching work may have been the result of simply removing the radiators, given the lack of supporting documentation in the record substantiating Mr. Sullivan's testimony. Resp. PFF, part 5, tab IX, at 2-3; R4, COF 5588; H.Tr., Sullivan, 5:88. However, Mr. Sullivan's credible and un rebutted testimony was based upon his personal knowledge of the events that gave rise to the change. H.Tr., Sullivan, 5:134.

Consequently, we find that Clark is entitled to recover its costs of repairing these holes. In this regard, Mr. Sullivan indicated the labor costs were accurately reported because there was basically one finisher doing this work. H.Tr., Sullivan, 5:85.

AOC argues that the grout costs included in this change claim may include grout for contractually required work, given that Clark Concrete estimated (after the work was done) \$120 for 10 bags of grout, as opposed to the \$408 claimed here.<sup>280</sup> Compare R4, COF 5589 with App. Exh. 24. On cross-examination, Mr. Sullivan was unable to explain why so much more grout was being claimed than was estimated, and admitted that Clark typically kept grout on-site for miscellaneous patching to meet Clark's other contract requirements. H.Tr., Sullivan, 5:89-90. We thus limit Clark's recovery of grout costs to \$120.

We also disallow the \$129 in overtime premiums included in this change claim. While we have no reason to question that this overtime was actually incurred, we note that the contract generally prohibited overtime unless expressly approved by AOC. A4, K0042. Mr. Sullivan provided no testimony as to why overtime was needed to accomplish this work. Moreover, since the overtime premiums claimed here were incurred prior (albeit just) to the February 5, 2001 cure notice, which we find constituted the only constructive acceleration order under this contract, we find no basis to allow Clark's claimed overtime premiums.

In sum, we find that Clark is entitled to recover \$4,297 for this constructive change.<sup>281</sup>

#### **N. Capital Refinishers Storage Costs, Clark Change Order No. 810075**

Clark claims \$2,069 for costs paid to Capital Refinishers for storing 24 grills for the rental radiators from the Orangerie--the storage of which was assertedly caused by AOC's failure to timely review the shop drawings for the refurbishment of the grills. H.Tr., Sullivan, 5:63; App. Exh. 28.

Capital Refinishers was to clean and refurbish the grills, which measure 4 feet by 8 feet and are 1 or 2 inches thick. H.Tr., Sullivan, 5:54, 120, 148. These grills were removed during the demolition stage of this contract and shipped to Capital Refinishers in April 1999 for that firm to clean and refurbish after the approval of its submittal for refurbishing the grills. *Id.* at 5:147-48. This submittal was submitted to AOC on April 16, 1999, App. Exh. 25, but was not approved by

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<sup>280</sup> Grout typically comes in 40 pound bags. H.Tr., Sullivan, 5:90.

<sup>281</sup> \$4,714 - \$288 (excess grout costs) - \$129 (overtime) = \$4,297.

AOC until November 10, 1999. App. Exh. 26. During this time, the grills remained with Capital Refinishers. H.Tr., Sullivan, 5:60.

As indicated above, a contractor's entitlement to an equitable adjustment is premised upon the proof of three necessary elements: (1) liability--that the government did something that changed the contractor's costs, for which the government is legally liable; (2) causation--that there exists a causal nexus between the basis for liability and the claimed increase in costs; and (3) resultant injury. *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199.

Here, the record shows that AOC did not timely review Capital Refinishers' submittal. The contract requires AOC to review and take action on this type of submittal within 30 calendar days. R4, K0091. Here, AOC's review and action on the submittal took 7 months. App. Exhs. 25, 26. It certainly seems plausible that this could have caused an increase in Capital Refinishers' costs, but we find that Clark has failed to establish the amount of resultant injury that may have been caused by AOC's delay.

The record contains a variety of claims from Capital Refinishers. On September 2, 1999, Capital Refinishers stated to Clark that the cost increase caused by the delay was \$2,640, but provided no further explanation or support for this claim. App. Exh. 27; H.Tr., Sullivan, 5:128, 146. On January 13, 2000, Capital Refinishers asserted damages totaling \$6,275 as a result of the "nine-month delay," including \$1,800 for 6 months storage, \$2,400 for additional salary/insurance and overhead increase, \$175 in chemical/supply cost increase, and \$1,900 for a change order to apply lacquer to aluminum.<sup>282</sup> R4, 2752. On July 29, 2000, Capital Refinishers submitted another invoice for \$1,800 for storage of the grills and certain "lights" (which it also had refurbished) from February 1, 2000 through July 31, 2000.<sup>283</sup> R4, 2756. On March 22, 2001, Clark resolved Capital Refinishers' subcontract claims for a total \$4,000 as follows:

Pursuant with our agreement this morning, attached for your signature is a change order totaling \$4,000. The change order is for the following: \$1,931.00 for the additional lacquer for the ornamental grilles, and \$2,069 for additional storage costs, and increase in material cost. Capital agrees to assist Clark in pursuing a claim against the Architect of the Capitol for the aforementioned costs. Also per our agreement, please have all the ornamental grilles delivered to site by the week of March 26, 2001. . . .

R4, 2760. Clark has provided evidence of payment of the \$2,069 to Capital Refinishers claimed here. App. Exh. 28.

We first note that Mr. Sullivan asserted that Capital Refinishers' plan was to immediately ship the grills back to the job site after completing their refurbishment and that AOC's failure to

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<sup>282</sup> The lacquer change order was resolved through the use of ADR provided by David Ashen of this Board and is no longer part of this appeal. H.Tr., Sullivan, 5:144.

<sup>283</sup> Mr. Sullivan testified that Capital Refinishers also refurbished some light fixtures that had been in the Orangerie. H.Tr., Sullivan, 5:54. Presumably, these are the "lights" to which Capital Refinishers is referring.

review the submittal caused Capital Refinishers to incur delay damages. H.Tr., Sullivan, 5:60. However, the record shows that Capital Refinishers apparently retained the grills well after they had performed the refurbishment, given that AOC approved the submittals on November 10, 1999 and Capital Refinishers did not deliver the grills to the site until March 26, 2001.<sup>284</sup> App. Exh. 26; R4, 2760. No explanation of this discrepancy has been provided, and this suggests that, contrary to Mr. Sullivan's testimony, it may have been Clark's plan to have Capital Refinishers retain the grills until they were needed at the site.

Mr. Sullivan testified that he negotiated this subcontract settlement with Capital Refinishers based solely upon that firm's September 2, 1999 claim for \$2,640, and that the settlement only included excess storage costs for May through November 1999, the 6 months of excessive time that AOC took to review Capital Refinishers' submittal.<sup>285</sup> H.Tr., Sullivan, 5:62-63, 144-45; App. Exh. 27. However, Capital Refinishers' claim included, and the settlement specifically was stated to cover, increases in material costs.<sup>286</sup> R4, 2760. Moreover, Mr. Sullivan does not explain how Capital Refinishers' other claims, for example, its claim for storage during 2000, were resolved, although he testified that he only paid for the 1999 storage costs and he believed that the March 22, 2001 settlement was the only one that settled Capital Refinishers' claims. H.Tr., Sullivan, 5:144-45. Furthermore, since Capital Refinishers' \$2,640 claim was submitted on September 12, 1999, prior to AOC's approval of the submittal on November 10, 1999, it could not have included storage costs through November, as was testified by Mr. Sullivan. App. Exhs. 26, 27. Finally, we note that any claimed storage costs may well have included costs for storing the Orangerie light fixtures, for which Clark makes no claim.

Under the circumstances, we find that Clark has not satisfied its burden of showing that the resultant injury from AOC's failure to timely approve Capital Refinishers' submittal was \$2,069. Therefore, we deny Clark's change claim.

#### **O. Traffic Requirements at Independence Avenue, Clark Change Order No. 810261**

Clark claims \$5,163 in expenses to address traffic and life safety concerns on Independence Avenue (one of the streets adjoining the Botanic Garden) that were raised by a representative of the District of Columbia Department of Public Works (DC DPW), District Division of Transportation, Bureau of Traffic Services.<sup>287</sup> R4, 9621, 9630.

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<sup>284</sup> Mr. Sullivan testified that he did not know whether Capital Refinishers stored the grills at its or some other facility. H.Tr. Sullivan, 5:119, 145.

<sup>285</sup> As noted above, there is no evidence in the record that supports the \$2,640 claim and Mr. Sullivan did not point to any invoice for storage costs during 1999. H.Tr., Sullivan, 5:128, 146.

<sup>286</sup> In fact, Mr. Sullivan contradicted his testimony that the settlement only included 1999 storage costs elsewhere in his testimony, when he stated that the settlement also included amounts for "increasing material costs." H.Tr., Sullivan, 5:132, 149.

<sup>287</sup> Clark's final revised claimed showed Clark's claim as \$4,555. App. Exh. 139, attach. 7. However, at the hearing, Clark presented evidence to support its \$5,163 claim.

Under the contract, Clark was permitted to close one lane of Independence Avenue whenever construction operations necessitated, in which case Clark was required to provide "traffic control personnel (flagmen etc.)." R4, K0130. In accordance with the contract, from almost the beginning of the project in 1998, one lane of Independence Avenue bordering the south side of the Botanic Garden was closed to facilitate construction operations and enclosed by a chain link fence and jersey wall barrier.<sup>288</sup> R4, Drawing SL001; H.Tr., Sullivan, 5:31-33, 101, 107-09; R4, Drawing, SL001; H.Tr., Sullivan, 5:31, 33. Also in accordance with the contract, Clark installed signs at specified locations along Independence Avenue warning motorists of the construction. R4, Drawing SL001; *see* H.Tr., Sullivan, 5:32, 105-06.

This claim arose from a visit to the site by a representative of the DC DPW on or about September 1, 2000. R4, 9638. This representative expressed safety concerns with the Independence Avenue lane closure, and provided Clark with a plan for additional features to address traffic and life safety concerns. *Id.*; H.Tr., Sullivan, 5:35. This plan included an additional sign, several specially designed barrels filled with sand designed to serve as crash cushions, and attenuators "on top of every barrier." R4, 9627-29, 9638; H.Tr., Sullivan, 5:42-48, 106-07, 112-14.

On September 12, Clark reported DC DPW's "request" to AOC and indicated that Clark considered this to be a contract change. R4, 9637; H.Tr., Sullivan, 5:36. On September 26, AOC advised Clark that DC DPW "does not have jurisdiction along Independence Ave," and provided a "Jurisdiction Map" showing why AOC believed that this was the case. R4, COF 5680; H.Tr., Sullivan, 5:114-15. Five or six weeks after his initial visit, the DC DPW representative again visited the site, and asked why his traffic and safety plan had not been implemented, in response to which Mr. Sullivan testified, "AOC says you don't have any jurisdiction on this corner here" and directed the representative to AOC's facility. H.Tr., Sullivan, 5:37.

Without requesting or awaiting any direction from AOC on this matter, Mr. Sullivan then immediately implemented the traffic and safety plan proposed by the DC DPW representative. H.Tr., Sullivan, 5:38. Mr. Sullivan stated that given the position and responsibilities of the DC DPW representative, who he believed had the authority to order this traffic and safety plan (notwithstanding AOC's advice), and the strong concerns that the DC DPW representative expressed about "life safety," Clark immediately implemented the plan.<sup>289</sup> *Id.* at 5:38-39. Mr. Sullivan also testified that implementing the plan addressing these legitimate life safety concerns was "right" and should have been included in the contract. *Id.* at 5:142-43.

The contract includes a number of clauses that clearly assigns the financial responsibility for complying with the DC DPW's direction to Clark, if that firm believed that it was necessary to address legitimate safety concerns, even if not imposed by AOC, or if it believed that DC DPW

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<sup>288</sup> Mr. Sullivan was assigned to the Botanic Garden project in December 1998, H.Tr., Forster, 12:96, and he testified that the fence and jersey wall barrier had been installed by that time. H.Tr., Sullivan, 5:108.

<sup>289</sup> Mr. Sullivan testified that he felt that if he did not implement the plan after being informed of the life safety concerns of the DC DPW representative, he may be personally liable. H.Tr., Sullivan, 5:39-40.

had the requisite authority to order the plan. Specifically, the Safety Precautions and Programs” clause of the contract states in pertinent part:

The Contractor shall take proper safety and health precautions to protect the work, the workers, the public and the property of others. . . .

R4, K0046. The Protection of Property and Persons clause of the contract similarly states in pertinent part:

The Contractor . . . shall provide and maintain necessary safeguards for protection of his employees, Government employees and the public generally, and he shall take all other proper precautions for their protection against injury. . . .

R4, K0047. Thus, Clark’s implementation of the DC DPW plan was appropriate, but not compensable, under the contract.

Moreover, the contract incorporated by reference the Permits and Responsibilities clause, FAR § 52.236-7 (Nov. 1991), R4, K0051, which provides in pertinent part:

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary license and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. . . .

Thus, even assuming that the DC DPW had the authority to require that its plan be implemented, it was Clark’s responsibility to ascertain the nature and scope and extent of local requirements which might impinge upon the work and to comply with applicable requirements at its expense. *R.P.M. Constr. Co.*, ASBCA No. 36965, June 12, 1990, 90-3 BCA ¶ 23,051, at 115,721. We therefore deny Clark’s change claim.

**P. Unilateral Deduct for PEPCO<sup>290</sup> Payment, Clark Change Order No. 810415**

Clark claims \$39,348, which AOC deducted from Clark’s contract to pay for the permanent power for the Botanic Garden conservatory from May 3, 2001 through October 22, 2001 after Clark’s refusal to pay for this power. The meter for permanent power for the facility was installed on May 3, 2001. R4, COF 3553. The record evidences that Clark did not specifically apprise AOC that the permanent power was installed or arrange to have PEPCO’s bills sent to AOC. In fact, the bills for this permanent power were addressed to Clark, which did not forward them to AOC. R4, COF 3545. Clark also maintained and separately paid for separately metered temporary power for the facility, which it used for its continuing construction activities until the temporary power was removed in August 2001. H.Tr., Sullivan, 8:9-11; App. Exh. 36.

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<sup>290</sup> PEPCO is the Potomac Electric Power Company, a public utility that provides electrical power in the Washington, D.C. area.

The contract provides in pertinent part:

### 3.2 TEMPORARY ELECTRIC POWER SERVICE

A. General: The Contractor shall provide, maintain, and pay all costs for weatherproof, grounded temporary power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of the work during the construction period. The Contractor shall pay for all power used during the performance of the Work.

1. [PEPCO] has informed the Architect that they can provide up to 400 amp, 120/208 Volt, 3 Phase, 4 wire service for temporary power from the existing vault located in Maryland Avenue, adjacent to the northwest corner of the Conservatory site.

### 3.5 TEMPORARY USE OF PERMANENT ELECTRICAL POWER AND LIGHTING

- A. When the permanent electrical power and lighting systems are in operating condition they may be used for temporary power and lighting for construction purposes provided that the Contractor:
1. Obtains the approval of the Architect.
  2. Assumes full responsibility for operation of the entire power and lighting system of that area.
  3. Restores the system to "like new" condition.
  4. Relamp the fixtures as required until and at Final Acceptance by the Government.

R4, K0125-27.

AOC's essential position is that Clark was responsible for the costs of all power to the facility during construction, which was not substantially complete until August 31, 2001. COD, Unilateral Deduct for PEPCO Payment.

However, the contract provides that Clark is only responsible for paying for permanent power if it uses that power. Mr. Sullivan testified at length and without rebuttal that Clark only used its temporary power for its construction activities during this period, including providing lighting, and that it did not require the use of permanent power for its construction activities. H.Tr., Sullivan, 8:14-15, 29.

The permanent power was installed in May 2001, at the same time the plants were going in. *Id.* at 8:15. According to Mr. Sullivan, because of the planting needs of the Botanic Garden, it was arranged collectively with the Botanic Garden staff for it to start taking over the west side of the Botanic Garden in May and June for the plantings for which Clark was not responsible, then move to the east side in July and August, to the Garden Court in August, and finally into the

Palm House. *Id.* at 8:16-17. In May, the Botanic Garden staff started “maintaining the controls of the lighting, the fans, the vents, [and] the HVAC system,” so the plants could be climatically maintained. *Id.* at 8:17. At night, all of the lights were turned on by the Botanic Garden staff, making the facility look like a “crystal palace,” *id.* at 8:17-18, but, according to Mr. Sullivan, Clark did not need this lighting because it did not generally work at night and when it did it had its own lighting. *Id.* at 8:15.

Based on the record, we find that Clark was not responsible for cost of the permanent power during this period. While AOC states that it should not be liable for these costs because it was unaware that PEPCO was billing for permanent power until November 2001, we think it should have noticed that the permanent power was connected, given that the building was lit up like a “crystal palace” at night by the Botanic Garden staff with the HVAC operating, as these were power outputs that could not be accomplished by temporary power. H.Tr., Sullivan, 8:22-23, 30.

Under the circumstances, we find that Clark is entitled to recover the \$39,348 that AOC deducted from its contract. However, Clark is not entitled to any markup on this amount as it does not represent an equitable adjustment to Clark’s contract, but is a reimbursement to Clark of an inappropriate offset by AOC.

## **XII. CLARK CONCRETE’S CLAIMS**

Clark Concrete was to perform all required structural concrete work. During the course of the contract, Clark Concrete also provided additional labor to supplement Clark’s workforce. Clark Concrete requests delay damages in the amount of \$538,935. App. Exh. 139, attach. 10. Clark Concrete also has submitted various change claims that we consider in this appeal.

### **A. Delay Claim**

As set forth in Appellant’s revised claim, Clark Concrete claims “delay” damages in the amount of \$538,935. App. Exh. 139, attach. 10. Clark Concrete is a wholly owned subsidiary of Clark and was the concrete subcontractor on the renovation project. App. Appeal at 43. Clark entered into a written subcontract agreement with Clark Concrete under which the latter was to perform all required structural concrete work for the original price of \$1,020,000. C4 Supp. 08 0257-60. Clark Concrete’s work included the South Addition (*e.g.*, slab on grade, walls, and structural slab), the east and west tunnels, and the East and West Transition Houses (*e.g.*, footings, walls). C4 Supp. 08 0254, 0260. Clark Concrete first mobilized to the job site on March 22, 1999 and completed 75 percent of its scope of work by October 31, 1999 (phase I). *Id.* at 0254. Clark Concrete remobilized to the job site from March 20 to December 10, 2000 (phase II), and again worked on site from March 19 to August 12, 2001 (phase III). *Id.* at 0255.

As set forth in the appeal, the original Clark Concrete claim in the amount of \$897,792 was for the additional costs the subcontractor incurred resulting from extended general conditions, acceleration, and inefficiencies allegedly due to the repeated resequencing of work. *Id.* at 0254-55. Clark Concrete elaborated its bases for recovery as follows:

- additional supervision and management labor and equipment/material costs associated with the additional 16-month performance period (*i.e.*, job site overhead);
- repeated demobilizations and remobilizations, which resulted in additional trucking and material restocking costs;
- working through an additional winter, requiring premiums for material and additional time for the heating and protection of on-going work;
- material escalation of both concrete and rebar;
- acceleration from May 1, 2000 until project completion, leading to increased overtime expenses;
- inefficiencies due to schedule changes and the re-sequencing of work;
- non-scope work for safety rail installation and maintenance; and
- completion of other subcontractors' scope of work

*Id.* at 0255-56.

DCAA audited the Clark Concrete claim and determined that Clark Concrete's accounting system, like that of Clark itself, was capable of capturing costs at a very detailed level, provided that an appropriate cost code number was created and the costs were so coded at the time of incurrence. DCAA Audit of Clark Concrete at 15. The audit report also stated:

However, per the subcontractor's representative during this audit, it was not the ordinary custom of this subsidiary to create special cost codes for unique purposes, but rather to charge any additional or extra costs to the standard cost code numbers. Nevertheless, during performance on this subcontract they did create some numbers for separate accounting.

*Id.* DCAA specifically questioned a total of \$358,857 of Clark Concrete's claim here.<sup>291</sup> *Id.* at 8-9. DCAA also took exception to Clark Concrete's use of a modified total cost method as the basis for its claim. *Id.* at 15-20.

At the hearing and subsequent thereto, Appellant revised both the amount of the Clark Concrete claim and the underlying basis for entitlement. Clark Concrete now claims costs in the amount of \$538,935. App. Exh. 139, attach. 10. Moreover, Appellant now contends that the additional costs incurred by Clark Concrete were the result of Clark's use of its subcontractor's workforce to support Clark's acceleration efforts.

No representatives of Clark Concrete testified at the hearing, and no evidence was introduced regarding the original bases of recovery set forth in Clark Concrete's claim. Mr. Sullivan of Clark instead testified that Clark Concrete provided the labor force used for the prime

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<sup>291</sup> DCAA's questioned costs are: (a) costs booked after completion in the amount of \$13,447; (b) costs not allocable as direct in the amount of \$5,919; (c) costs not required for performance in the amount of \$10,533; (d) costs already settled in the amount of \$114,187; (e) costs claimed separately in the amount of \$9,847; (f) costs for other subcontractors' work in the amount of \$49,109; (g) home office overhead in the amount of \$74,197; and (h) profit in the amount of \$81,618. DCAA Audit of Clark Contract at 8-9.

contractor's acceleration from early 2000 through the latter portion of the project. H.Tr., Sullivan, 13:82-84. Mr. Sullivan stated that "I brought in a labor force, if you will, a bunch of people, laborers, that I got from Clark Concrete to do some of the things that are inevitable in acceleration, especially to the magnitude that we were doing." H.Tr., Sullivan, 13:82. In addition, Mr. Dylus of Clark testified that "[e]ssentially, once Clark Concrete finished their scope of work, they became the labor force for completion of the project."<sup>292</sup> H.Tr., Dylus, 22:149. In its post-hearing brief, Clark asserts that the entire \$538,935 revised amount now claimed by Clark Concrete were costs that the subcontractor incurred to support Clark's acceleration. Clark PFF ¶ 418.

Clark Concrete's revised claim was calculated as follows:

Total Actual Costs	\$2,069,146
Current Subcontract Price	<\$1,099,165> <sup>293</sup>
Cost Overrun (Original Scope)	<\$110,052>
Change Orders	<\$117,952> <sup>294</sup>
Subtotal	\$741,977
Home Office Overhead (10%)	\$74,197
Profit (10%)	\$81,618
Subtotal	\$897,792
DCAA Questioned Costs	<\$358,857> <sup>295</sup>
<b>Total</b>	<b>\$538,935</b>

C4 Supp. 08 0257; H.Tr., Dylus, 22:151-52.

Clark Concrete's revised claim, like its predecessor, is a modified total cost one. Specifically, other than the additional costs for which the contractor accepts liability (*i.e.*, a projected cost overrun of \$110,052), the costs associated with specific change orders (\$117,952), and the costs which DCAA questioned in its audit (\$358,857), Clark Concrete claims all the costs it incurred in excess of its subcontract price without demonstrating what particular costs were related to one or more specific causal factors. In this regard, we particularly note that the Clark Concrete claim here apparently does not remove all change order costs, but, for example, includes the costs of

<sup>292</sup> Mr. Dylus also provided an example of Clark Concrete labor being used to complete subcontractor Kalos' scope of work of in order to aid the acceleration effort. *Id.* at 22:149-51; *see* Clark PFF ¶ 417.

<sup>293</sup> This figure represents the sum of Clark Concrete's original subcontract price of \$1,020,000, plus \$79,165 in approved change orders. C4 Supp. 13 0246.

<sup>294</sup> This figure included costs for a number of unapproved change orders. App. Exh. 139, attach. 8.

<sup>295</sup> Clark accepted the DCAA audit findings in total, and adjusted its revised claim for Clark Concrete by the corresponding amount that DCAA questioned. H.Tr., Dylus, 22:151-52.

Clark Change Order No. 810025, South Addition Subgrade, in the amount of \$173,504, H.Tr. 28:273, even though this work has nothing to do with Clark Concrete's acceleration effort.<sup>296</sup>

We have previously stated that use of a total cost or modified total cost method is disfavored, and that the plaintiff must establish specific prerequisites before the recovery of damages under this approach will be permitted: (1) the nature of the particular cost is impossible or highly impracticable to determine with a reasonable degree of certainty; (2) the contractor's bid was realistic; (3) the contractor's actual incurred costs were reasonable; and (4) the contractor was not responsible for any of the added costs. *WRB Corp. v. United States*, 183 Ct. Cl. at 426; *Propellex Corp. v. Brownlee*, 342 F.3d at 1338.

Here, Appellant has not established or even attempted to establish the necessary prerequisites for use of a total cost method. Appellant instead argues that the Clark Concrete claim is not a total cost one, but rather represents the direct costs incurred by Clark Concrete when used by Clark as its additional labor force to accelerate the project. App. Reply Brief at 40-41. This argument reflects either a fundamental misunderstanding of the nature of a total cost claim or the disingenuous use of semantics in an attempt to avoid the legal restrictions upon its use. In this regard, we note that, even assuming *arguendo*, Clark Concrete's claim reflects the direct costs it incurred while performing acceleration work for Clark, the claim presented is not one in which the contractor segregated and accumulated the actual costs so incurred (*i.e.*, an actual cost method). Rather, Clark Concrete's claim is one that calculates the difference between the original contract price and the actual total cost of performing the contract as changed (*i.e.*, a total cost method, here modified as set forth above). See *Servidone Constr. Corp. v. United States*, 931 F.2d at 861.

The present basis of Clark Concrete's claim is that it represents work performed on behalf of Clark in furtherance of the prime contractor's acceleration efforts. This work was clearly not related to, and was in addition to, Clark Concrete's original scope of work. We know of no reason (and Appellant has presented none) why Clark Concrete could not have separately tracked and accounted for the costs incurred performing work that was clearly beyond the scope of its contractual responsibilities.<sup>297</sup> Moreover, we note that Clark Concrete's decision not to

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<sup>296</sup> The claim history of Clark change order 810025, South Addition Subgrade, requires some explanation. In its original claim to the contracting officer, Clark represented the South Addition Subgrade change order work as being Clark Concrete's. R4, 4563-65. As part of its appeal, however, Clark asserted that the change order was on Clark's own behalf (though the amount sought remained the same). C4 Supp. 08 1140. Clark also represented to DCAA during the audit that the change order was correctly one involving the prime contractor. H.Tr., Erdelsky, 8:120-24; see DCAA Audit of Clark at 21-24. During the hearing, Clark submitted an interim revised claim that again changed the ownership of the South Addition Subgrade change order back to Clark Concrete. After the DCAA auditor testified that Appellant's claim now appeared to have double-counted the change order (once by itself and once as part of the Clark Concrete total cost claim), H.Tr., Erdelsky, 27:205-08, Clark, by means of its final revised claim, abandoned the separate South Addition Subgrade change order and left it as part of the Clark Concrete claim here. H.Tr. 28:273; App. Exh. 139, attach. 8.

<sup>297</sup> Clark has also offered no explanation why the non-scope work performed by Clark Concrete on Clark's behalf was not represented as a basis of recovery (or the basis of recovery) as part of the

separately account for the work performed on behalf of Clark was inconsistent with the subcontractor's conduct on other occasions when Clark Concrete did establish separate accounts to capture the costs of work done on behalf of other subcontractors. *See* DCAA Audit of Clark Concrete at 9. The fact that Clark Concrete is a wholly owned subsidiary of the company for which the non-scope work was rendered does not alter either its ability or the requirement to capture the actual costs for the work now being claimed. In sum, as Appellant has failed to establish that the nature of the particular costs incurred and claimed by Clark Concrete were impossible or highly impracticable to track, and has not otherwise shown that these claimed costs are reasonable or related to the claimed delay, Clark Concrete's claim is denied.

### **B. Clark Concrete Change Claims**

Clark Concrete has submitted a number of change claims in association with those of other subcontractors that had the primary stake in the particular change. For each of these change claims, Clark Concrete has requested markups of 10 percent each for overhead and profit to its claimed direct costs. To Clark Concrete's total claim, Clark has in turn requested a 1.73-percent overhead and 10-percent profit markup. As indicated above, Clark Concrete is a wholly owned subsidiary of Clark. App. Appeal at 43. As described by Mr. Sullivan, "there's a thin line between Clark Concrete and Clark Construction, but I was directing them, I was paying them, it comes out of the same pot, if you will, it's just the only difference is the cost code that you would code they are paid with (sic)." H.Tr., Sullivan, 5:75. In fact, several of the change claims for labor and material costs initially submitted on behalf of Clark Concrete were later submitted on behalf of Clark (*e.g.*, Clark Change Order Nos. 810344 & 810303).

In its audit of Clark Concrete, DCAA took exception to Clark Concrete's overhead and profit markups on its change claims. With regard to the overhead markup, DCAA noted that as a wholly own subsidiary of Clark, Clark Concrete's applicable home office overhead is identical to that of Clark, which has in turn claimed an overhead markup in addition to Clark Concrete's overhead markup. DCAA observed that this rate "should only be applied once" and that since the "prime contractor has applied it to all subcontract costs in its portion of the claim, then it should not be applied" to Clark Concrete's change claims. DCAA Audit of Clark Concrete at 6. DCAA also took exception to Clark Concrete's profit markup because it is a wholly-owned subsidiary of Clark. *Id.* In so doing, DCAA referenced FAR § 31.205-26(e), which provides that "[a]llowance for all materials, supplies, and services that are sold or transferred between any divisions, subdivisions, subsidiaries, or affiliates of the contractor under a common control shall be on the basis of cost incurred," which means that profit cannot be reimbursed in such circumstances. *Id.* One purpose of this rule is to prevent the double recovery of profit on the same work by commonly held companies. *See A.S. Thomas, Inc.*, ASBCA No. 10745, March 7, 1966, 66-1 BCA ¶ 5438 at 25,495; *Mauch Laboratories, Inc.*, ASBCA No. 8559, January 10, 1964, 1964 BCA ¶ 4023 at 19,803.

Clark has provided no testimony or legal argument responding to DCAA's audit findings. Based on our review, we find DCAA's determination to disallow the Clark Concrete overhead and

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subcontractor's original claim, as presumably both Clark and Clark Concrete would have known this fact if this was the case.

profit markups as being duplicative of Clark's markups to be reasonably based and disallow them on Clark Concrete's allowable change claims.

### **XIII. JUDD'S CLAIMS**

Judd was the electrical subcontractor. Clark's revised claim seeks \$2,138,709 on behalf of Wausau (the surety for Judd) based on government-caused delay and/or acceleration. App. Exh. 139. Clark also claims \$302,838 on its own behalf for "Judd Supplementation Costs" based on the same delay/acceleration theory. *Id.* There are also a number of change claims for which Judd has claimed costs.

#### **A. Delay/Acceleration Claim**

After award of the renovation contract, Clark entered into a subcontract agreement with Judd to perform the project's electrical work at an original price of \$1,740,000. C4 Supp. 16 0008-14. Wausau, a surety company, provided performance and payment bonds to secure Judd's performance of its subcontract with Clark for the work on the Botanic Garden renovation project. C4 Supp. 16 0033-35. Judd originally planned to start electrical field installation on April 8, 1999, and complete the electrical installation by September 5, 2000. *Id.* at 16 0235.

During the course of contract performance, Judd encountered financial difficulties that impacted its ability to complete the scope of work under its subcontract with Clark. For example, Judd's costs for performing the Botanic Garden contract assertedly advanced more rapidly than its ability to invoice for offsetting progress payments (which were based on percentage of work completed).<sup>298</sup> C4 Supp. 16 0049. Contract changes also impacted Judd's financial difficulties, given the time lapse between when costs were incurred and when settlement (and payment) was made. C4 Supp. 16 0057. Such time lags allegedly resulted from the fact that the contract change orders often involved multiple subcontractors, as it was AOC's practice not to settle specific change orders in a piecemeal manner, that is, without receiving proposals from all subcontractors affected by the change.<sup>299</sup> C4 Supp. 16 0308.

On April 14, 2000, Clark directed Judd to accelerate its scope of work. C4 Supp. 16 0226. Judd subsequently told Clark of the performance difficulties it was encountering as a result of the various subcontractor trades working on top of each other in order to get the project completed. C4 Supp. 16 0287-89. Judd also informed Clark of its increasing financial difficulties, stating, "As we discussed we can handle the production side of getting the work completed if Clark can assist us in the financial side of proceeding with the approximately 100 unapproved changes valued at approximately \$1,000,000." C4 Supp. 16 0288. By October 2000, Judd's capability to

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<sup>298</sup> As early as November 1999, Judd informed Clark that while the project had consumed 50 percent of the allocated days, Judd was able to invoice and receive only approximately 10 percent of its contract price, and that the costs incurred to date far exceeded the payments it had then received. C4 Supp. 16 0049.

<sup>299</sup> The record does not show how much was ultimately paid or was due under these change order proposals, although our review has disclosed instances where Judd's initially submitted change order claims were grossly inflated.

perform its portion of the renovation contract and meet the contract schedule was in doubt. As expressed by an internal Judd memo,

In my opinion, Judd cannot complete the job with this schedule. We don't have the man power [sic], the lead men, or the tools to keep up with all of the different trades. . . . There is no way Judd forces in the field can stay ahead of all these people. Even with a drastic influx of productive people we do not have enough people in place that know the job, and can lay out the work.

C4 Supp. 16 0293.

Clark also realized that Judd was no longer providing the increased manpower necessary to meet the renovation project schedule. In response, Clark demanded that Judd increase its manpower commitments (both the number of employees and the hours worked), and informed that firm of its intention to supplement Judd's forces with other electrical workers if the subcontractor could not man the project so as to meet the schedule deadlines. C4 Supp. 16 0297-98, 0301, 0308, 0403. Judd then notified Clark that it could not finance the amount due under change order proposals (totaling more than \$1.5 million, C4 Supp. 16 0333) and would no longer proceed with any contract changes without a unilateral or bilateral agreement as to payment. C4 Supp. 16 0309.

The parties then undertook various measures in an attempt to address Judd's financial difficulties. For example, Clark reduced Judd's retainage on the project, thereby resulting in the release of approximately \$100,000 in contract funds to Judd. C4 Supp. 16 0340. Clark and AOC also discussed at length the review and approval of Judd's changes specifically, and the change order review and settlement process generally. Additionally, in order to preclude Judd's default for which Wausau as surety would then be required to assume performance, Wausau provided initial financial assistance in the amount of \$300,000 to Judd to allow the firm to complete its subcontract requirements. D.Tr., Foxhall, 12; App. Exhs. 3, 95.

After this initial assistance had been provided by Wausau, on March 29, 2001, Clark, Judd and Wausau entered into an agreement to further Judd's financial ability to complete performance on the Botanic Garden contract. In relevant part this agreement stated:

Clark shall, as necessary, advance an additional three hundred thousand dollars (\$300,000.00) to Judd to assist Judd in the performance of its Subcontract obligations. This advance shall be accounted for as an advance against funds which Judd contends it is owed for change orders.

If, after the advances as described . . . above, Judd does not have the ability to finance completion of its Subcontract obligations, then, Wausau shall advance an additional one hundred fifty thousand dollars (\$150,000.00) to Judd to assist Judd in completing its obligations under the Subcontract.

If, after the advances described . . . above, Judd does not have the financial ability to complete its Subcontract obligations, then Clark shall advance an additional

one hundred fifty thousand dollars (\$150,000.00) to assist Judd in the performance of its Subcontract obligations. This advance shall also be accounted for as an advance against funds which Judd contends it is owed for change orders.

App. Exh. 3.

Consistent with the parties' agreement, both Wausau and Clark provided funding to Judd, which was distributed on an incremental basis and which permitted Judd to meet its weekly payroll obligations, pay its material suppliers, and cover other associated expenses (e.g., union dues, payroll taxes) related to performance of the renovation contract. H.Tr., Dylus, 22:184; C4 Supp. 16 0401-02, 0474-75, 0481-86. The monies advanced to Judd by Clark were used to further Judd's performance on the Botanic Garden contract generally; Clark cannot identify to what extent the monies it advanced to Judd were used for base contract work, approved change orders, or the additional amounts claimed by Judd. See H.Tr., Dylus, 22:185-86. By the end of the contract, Clark had provided Judd with a total of \$450,000 in funding, *id.* at 22:187, while Wausau had made payments to Judd or on Judd's behalf totaling \$1,235,592. App. Exh. 95.

Notwithstanding the financial assistance provided to it by both Wausau and Clark, Judd was unable to overcome its financial difficulties or provide sufficient manpower to complete its subcontract requirements in a timely manner. Clark eventually supplemented Judd's work with additional manpower from Truland. C4 Supp. 16 0406. We understand that Judd apparently ceased as a functioning business entity at some point around or after contract completion.

On March 1, 2002, Wausau submitted a claim for Judd in the amount of \$2,138,709. C4 Supp. 08 0265-67. Wausau's claim consists of the \$1,235,592 in direct payments that the surety made on behalf of Judd, as well as \$108,981 in attorneys' fees and accounting costs to protect the surety's rights.<sup>300</sup> *Id.* Wausau also claims \$504,408 for the additional estimated costs for concluding its obligations under its performance bond and payment to additional vendors for materials to Judd, payroll fringe benefits, and union dues.<sup>301</sup> *Id.* Lastly, as surety for Judd and subrogated to all of Judd's rights in and to any claims for losses incurred by Judd, Wausau claims \$289,729 in costs incurred by Judd in excess of contract revenues.<sup>302</sup> *Id.* No witnesses from Judd or Wausau testified at the hearing regarding Judd's claims.<sup>303</sup>

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<sup>300</sup> In support of this claim, Appellant provided documentation showing that Wausau's total payments to or on behalf of Judd. App. Exh. 95.

<sup>301</sup> Appellant provided no documentation showing how Wausau computed this estimated additional cost.

<sup>302</sup> Again, no evidence was introduced to demonstrate that Judd incurred \$289,729 in costs in excess of its contract revenues as claimed.

<sup>303</sup> By agreement of the parties, portions of the deposition of L. Neal Foxhall, formerly in charge of the Wausau Surety Claim Department, were made part of the record. However, he did not provide sufficient support to allow recovery of the claimed amounts, but only testified as to the amounts paid for Judd.

In addition to the amounts claimed by Wausau on behalf of Judd, Clark claims "Judd Supplementation Costs" in the amount of \$302,838.<sup>304</sup> Appellant's claim here represents the total monies that Clark advanced to Judd to finance its continued contract performance (\$450,000) minus the amounts received by Clark from Judd change orders (\$147,162). App. Exh. 139, attach. 7. Appellant's claim here is a contingent one. Specifically, Clark seeks this amount only to the extent it does not receive at least this amount by our resolution of Judd's remaining change claims. App. PFF ¶ 410.

The record contains evidence that Judd incurred delays and accelerated work during the performance of the Botanic Garden contract. Much of the electrical work that Judd planned to perform did not take place when originally planned, and was affected by the delays experienced by Clark as well as by various change orders. See C4 Supp. 16 0045, 0099; H.Tr., Mansfield, 22:18-53.<sup>305</sup> Conversely, there is also evidence that Judd did not provide adequate manpower to successfully perform the electrical work on this project, even though it was repeatedly requested to do so by Clark. See H.Tr., Mansfield at 22:53. In any case, even given that Judd's contract performance was delayed and/or accelerated by AOC's actions, Appellant has provided no basis that would permit recovery of the claimed delay/acceleration damages here.

First, there is no legal basis to recover costs against the government merely because they were loaned or advanced to a contractor.<sup>306</sup> See FAR § 31.205-20. The monies provided by Wausau and Clark to Judd did not change the scope of work performed by Judd (or the scope of work performed by Clark) under the Botanic Garden contract. While the agreement signed by Judd, Clark, and Wausau sets forth in great detail the parties' financing arrangements, it contains no change to the work requirements of Judd's subcontract with Clark. See App. Exh. 3. The amounts provided to Judd by Wausau and Clark were merely a method to finance the subcontractor's performance and did not change Judd requirements, and therefore these advances did not represent contract changes that added value to the contract. See H.Tr., Erdelsky, 27:192-93; DCAA Audit of Clark at 7.

Clark nevertheless argues that the amounts loaned by itself and Wausau to Judd were used to perform work altered by delays, disruptions, and schedule resequencing, and that the loan amounts are a reasonable measure of the increased costs incurred by Judd as a result of government-caused delays. App. PFF ¶¶ 408, 410, 423.

Here too, the amounts sought by Clark and Wausau constitute total cost claims insofar as they seek to recover all the monies expended by or for Judd in excess of the subcontractor's contract

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<sup>304</sup> While Clark's Post-Hearing Brief states this amount as \$304,708, App. PFF ¶ 410, its amended claim is for \$302,838. App. Exh. 139.

<sup>305</sup> Mr. Mansfield, a consultant employed by Clark who also supported Judd's work, provided some general and anecdotal testimony that Judd's performance under the contract was adversely impacted by the number of design issues and change orders on the project, and concluded that in his opinion but for AOC's alleged failure to timely process change order requests and its acceleration effort Judd could have successfully performed the subcontract work. H.Tr., Mansfield, 22:18-53.

<sup>306</sup> Clark cites no applicable legal authority for awarding damages in such circumstances.

revenues. This includes all the amounts incurred directly by Judd in excess of its contract price (\$289,729), all the actual amounts incurred by Wausau to further Judd's performance (\$1,235,592 plus \$108,981 in attorneys' fees), the additional amounts estimated by Wausau to further Judd's performance (\$504,407), as well as all the unreimbursed amounts incurred by Clark to further Judd's performance (\$302,838). As recognized by Clark itself, the monies that were advanced to Judd and claimed here by Clark and Wausau were used by Judd without limitation to perform base contract work, approved change order work, and claimed change order work. H.Tr., Dylus, 22:185-86. Quite simply, the claims of Clark and Wausau here blandly assume that all the costs incurred by or for Judd in excess of the subcontractor's contract price resulted in an equal amount of additional reasonable, allocable, and allowable costs incurred by Judd on the project as a result of compensable government actions or inactions. This amounts to a total cost claim regardless of how is labeled by Clark.

Here, even assuming, *arguendo*, that the amounts advanced to Judd by Wausau and Clark were used exclusively for performance of the Botanic Garden contract, Clark has failed to establish the prerequisites for recovery on a total cost basis. Clark has presented no evidence to establish that Judd's actual incurred costs were reasonable, that Judd's subcontract price was realistic, that Judd was not itself responsible for any of its added costs, or that it was impossible or highly impracticable for Judd to segregate and determine its delay costs with a reasonable degree of certainty.<sup>307</sup> As Clark has only proven the additional amounts incurred on behalf of Judd, and has not met its burden of using a total cost method, its claim here is denied.

## **B. PEPCO Duct Bank Issues, Clark Change Order No. 810266**

### **1. Background**

Clark claims \$20,982 on behalf of Judd (\$14,734, including Judd's markups) and Clark Concrete (\$6,248, including Clark Concrete's markups) for certain changes required by PEPCO at its connection with the Botanic Garden facility at the South Addition.<sup>308</sup> App. Exh. 139, attach. 8; R4, 9640-41, 9644; H.Tr., Sullivan, 1:278, 288.<sup>309</sup>

Some of the contract provisions pertinent to this change claim are:

The Architect will contract with [PEPCO] for a new electric service for the Conservatory. The location of the new service and vault is generally shown on

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<sup>307</sup> Mr. Mansfield's opinion that Judd could have successfully performed the subcontract work if its change order requests had been timely processed or its work not delayed/accelerated does not meet Clark's burden here. H.Tr., Mansfield, 22:53.

<sup>308</sup> Judd's claim initially included \$8,391 that it paid based on a PEPCO invoice. However, Mr. Sullivan, at the hearing, was unable to identify what this PEPCO invoice was for, so Appellant amended its claim to remove this amount. H.Tr., Sullivan, 1:278, 288; App. Exh. 139, attach. 8.

<sup>309</sup> Only Mr. Sullivan of Clark provided testimony at the hearing regarding this change claim. No Judd or Clark Concrete witness provided testimony about this or any other change claim where these firms claimed costs.

Contract Drawing No. E003. The contractor shall coordinate with PEPCO and provide whatever access is needed so that the new service can be installed. . . .

R4, K0081, and:

The installation of the utility manholes and handholes shall conform to the standards of [PEPCO]. Coordinate installation with the Utility. . . .

R4, K1337.

Revision 1 to Contract Drawing E003 detailed Clark's electrical work where it interfaced with PEPCO. Specifically, this drawing showed a new 4-foot by 4-foot by 4-foot manhole to be installed by Clark at the south west corner of the facility.<sup>310</sup> C4 Supp. Drawing E003, Revision 1; H.Tr., Sullivan, 1:255, 266-67. The drawing showed a four-way, four-inch duct, to be constructed by Clark, going east from this manhole to a 6-foot by 18-foot PEPCO transformer vault wherein PEPCO would install its transformers. C4 Supp. Drawing E003, Revision 1; R4, Drawing E504, detail J17; H.Tr., Sullivan, 1:255, 273; R4, 9643. Note 10 on Drawing E003, Revision 1, stated, "Installation of meter socket, underground ductbank, & transformer pad shall be per PEPCO design standards." C4 Supp. Drawing E003, Revision 1.

In July 2000, a "request was made" to Judd to provide a layout drawing of the routing in this area for review.<sup>311</sup> R4, 9643. Mr. Mansfield then prepared a layout plan drawing on July 18, 2000, which was provided to PEPCO at about this time. C4 Supp. Drawing PEPCO-1; H.Tr., Sullivan, 1:263. According to Judd, "the site was finally ready for us to install this work, [but] we could not get PEPCO to inspect it until the drawing was reviewed." R4, 9643. On or about September 15, 2000, Judd went to PEPCO's facility to pick up the drawings to allow for inspection, and at that time discovered that PEPCO had changed the required size of the manhole to 8-foot by 6-foot by 8-foot and had changed the required size of the duct to four-way, five-inch. R4, 9643; Resp. Exh. 2; H.Tr., Sullivan, 1:260, 270, 274. After some consultation with AOC, Judd and Clark Concrete implemented the change mandated by PEPCO. *See* H.Tr., Sullivan, 1:254-55, 287.

Prior to learning of the change in requirements in September, Judd had already begun installing the four-way, four-inch duct. Because of PEPCO's new requirements, Judd had to remove this duct, which was laying in the trench waiting to be inspected, and replace it with the four-way, five-inch duct. Resp. Exh. 2; H.Tr., Sullivan, 1:255, 260. Also because of PEPCO's new requirements, Clark Concrete had to excavate and backfill a larger hole for the larger manhole than it would have for the smaller manhole. H.Tr., Sullivan, 1:260. It is the costs for these items of work that form the basis for Judd's and Clark Concrete's claims.

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<sup>310</sup> The original contract drawing showed that the installation of this manhole was PEPCO's responsibility. R4, Drawing E003

<sup>311</sup> No testimony has been provided as to who made this request.

## 2. Analysis

AOC denied this change claim based upon the above-quoted contract provisions requiring coordination with PEPCO and the Note 10 requirement that installation of the duct bank be as per "PEPCO design standards." COD, PEPCO Ductbank Issues. However, Drawing E003, Revision 1 contained very specific requirements concerning the size of the affected duct and manhole. We find that the general contract requirements that Clark coordinate with, and adhere to the design standards of, PEPCO do not override the clearly stated design requirements shown on the contract drawings. *See Hills Materials Co. v. Rice*, 982 F.2d 514, 517 (Fed. Cir. 1992) ("Where specific and general terms of a contract are in conflict, those which relate to a particular matter control over the more general language.") Thus, AOC's argument does not provide a basis to deny Judd's and Clark Concrete's recovery of their reasonable costs of implementing this contract change.<sup>312</sup>

## 3. Judd's Claim

AOC does not specifically challenge the reasonableness of Judd's claimed costs totaling \$14,374 (including markups), which are based on estimated rather than actual costs, but asserts that it was unreasonable for Judd to begin the installation of the four-way, four-inch duct without first coordinating the matter with PEPCO, as required by the contract. We agree.

As noted above, the layout drawings for the electrical work, showing the four-way, four-inch duct, had been provided to PEPCO for its review consistent with the contract requirement that this work be coordinated with PEPCO, which had to inspect Judd's work and which declined to do so until the drawing had been reviewed. R4, 9643; C4 Supp. PEPCO-1. Judd did not await this review, but proceeded with installing the four-way, four-inch duct. Resp. Exh. 2. Judd has offered no excuse for proceeding without coordinating with PEPCO, except to note that the "site was finally ready for us to install this work." R4, 9642-43.

We find Judd's action in this respect to be unreasonable, and will not allow that portion of Judd's costs associated with removing the four-way, four-inch duct and with remobilization to install the four-way, five-inch duct. Judd's claim included 22 hours or \$842 for these tasks.<sup>313</sup> R4, 9644. To this figure, we add Judd's 10-percent overhead and 10-percent profit markups to arrive at total disallowed costs of \$1,019.<sup>314</sup>

The remainder of Judd's claimed costs are for installation of the four-way, five-inch duct. However, as noted by AOC, as part of this PEPCO change, Judd was no longer required to provide a 3.5-foot by 3.5-foot taphole and its claim did not include a credit for these costs.

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<sup>312</sup> AOC now also argues that these subcontractors cannot be compensated because PEPCO is not authorized to change the contract requirements. Resp. PFF part 6, Tab IV, at 4. However, not only has Mr. Sullivan testified that he coordinated this change with AOC, H.Tr., Sullivan, 1:254-55, 287, but AOC does not argue that this change was not required.

<sup>313</sup> 22 hours x \$26.92 labor rate x 1.421 fringe rate = \$842.

<sup>314</sup> \$842 + \$84 (overhead) + \$93 (profit) = \$1,019.

Resp. Exh. 2; H.Tr., Sullivan, 1:275-76. Mr. Sullivan estimated the costs of providing such a taphole as \$350 to \$400. H.Tr., Sullivan, 1:271. In the absence of any better evidence, we find that AOC was entitled to a credit of \$413 for this deleted work.<sup>315</sup>

Therefore, in the absence of any other challenge by AOC to the reasonableness of Judd's claimed costs, we find that Judd is entitled to recover \$13,302 for this change claim.<sup>316</sup>

#### 4. Clark Concrete's Claim

AOC also does not challenge the reasonableness of the costs of \$6,248 (including markups) claimed in Clark Concrete's change claim, which is also based on estimated rather than actual costs. AOC does argue, however, and the record confirms, that this claim did not include a credit for the excavation work that Clark Concrete would have had to perform to install the smaller 4-foot by 4-foot by 4-foot manhole.

Mr. Sullivan explained that, before this change was required, Clark Concrete was going to dig a hole 4 foot deep and "lay it on top of that duct bank and backfill it," and that "what PEPCO wanted was an 8 foot deep panel with an 8-foot x 6-foot interior dimension to basically encase a portion of that duct bank so that they could then go down in that duct bank and have room to jackhammer into that duct bank, tap into their live lines and run power to the conservatory." H.Tr., Sullivan, 1:269-70. This required Clark Concrete to "form walls, put rebar in, for the other side of the walls, pour it, waterproof it, backfill it." *Id.* at 1:270. That is, "[t]he vault now had to surround this existing duct bank; whereas, before we were just going to dig a hole and set this thing on top of the duct bank. Now we had to dig a hole around it and form and pour walls and slab walls." *Id.* at 1:284-85.

Mr. Sullivan estimated that it would have taken only an hour with a backhoe to excavate the hole for the smaller manhole and an hour with a backhoe to backfill it. *Id.* at 1:286. He also estimated the smaller manhole cover that was not used would cost between \$350 and \$400. *Id.* at 1:271. We have no reason not to credit Mr. Sullivan's testimony, inasmuch as AOC has provided no evidence as to the amount of the credit that it believes Clark owes AOC. Mr. Sullivan's testimony and Clark Concrete's claim provide a basis for estimating what AOC is due for the excavation and backfill work that it would have had to perform in installing the smaller manholes and for providing the smaller manhole cover. *See* R4, 9640. Based on our review of Clark Concrete's claim, we find that AOC is entitled to a credit of \$639 for the work that Clark Concrete did not have to perform.<sup>317</sup>

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<sup>315</sup> \$375 + \$38 + \$41 = \$413

<sup>316</sup> \$14,734 - \$1,019 - \$413 = \$13,302.

<sup>317</sup> \$100 (2 hours of bobcat) + \$48 (2 hours labor foreman) + \$116 (2 hours apiece for 3 laborers) = \$264 + \$375 (manhole cover) = \$639. R4, 9640.

Also, for the reasons discussed above, Clark Concrete, as a subsidiary of Clark, is not entitled to recover the 10-percent markups for overhead and profit, which here total \$1,084. Thus, we find that Clark Concrete is entitled to recover \$4,525 for this change claim.<sup>318</sup>

### C. Starters and Disconnects, Clark Change Order No. 810233

Judd claims \$29,262 for procuring and installing additional starters and disconnects that were not called for in the contract. R4, COF 4291. Based on a DMJM estimate, AOC had determined that Judd is entitled to recover \$7,562 for this change and unilaterally amended the contract to provide for this recovery.<sup>319</sup> R4, COF 4279, 4311. At the hearing, Clark stated that, based on Mr. Mansfield's analysis, Judd's claim was now \$22,870 (not yet accounting for the amount previously credited Judd). H.Tr., 8:44.

This change claim arose from Judd's discovery, in the course of preparing shop drawings and installing the electrical system, that some of the motor driven equipment being installed required starters and/or disconnects that were not called for in the contract but were required for the equipment to operate. H.Tr., Mansfield, 8:50. A starter is an item that helps the motor to get energized and get going, *id.*, and a disconnect turns the motor on and off. *Id.* at 8:54.

This led to RFI No. 482, dated June 9, 2000, where Clark/Judd pointed to specific items of equipment and asked whether starters were required. R4, COF 4301. In response, AOC/DMJM stated that starters should be provided for three motors, disconnects for two other motors, and combined motor/disconnects for three other motors. *Id.* In RFI No. 482a, dated June 30, in response to Clark/Judd's specific request, AOC/DMJM added starters for the two motors for which RFI No. 482 had ordered disconnects. R4, COF 4305. In response to a July 5 Clark letter stating that it would not perform the work without a change order, R4, COF 4300, AOC issued a change order to the contract restating the substance of the two RFI responses. R4, COF 4299.

Judd's claim also includes costs for four more starters and their installation, which were only specifically identified by Judd after it had submitted its initial claim. R4, COF 4290, 4292-93, 4309. In total, Judd's claim includes the costs for 11 combined starter/disconnects, and the material and labor costs associated with their installation. H.Tr., R4, COF 4292-93; Mansfield, 8:54-55.

Judd's initial claim dated November 9 totaled \$36,794. This claim was downwardly revised by Clark to \$29,504 before it was submitted to AOC on December 20. R4, COF 4295, 4306. On January 9, 2001, AOC advised Clark of the substantial discrepancy between Judd's proposal and DMJM's \$8,318 estimate, dated June 23, 2000, and reiterated previous requests that it had made for the actual invoices showing the prices for the starters and/or disconnects. R4, COF 4285. Clark passed AOC's request on to Judd with the observation that it would accept AOC's settlement offer for this change order if this information was not provided. R4, COF 4283. On

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<sup>318</sup> \$6,248 - \$639 - \$1,084 = \$4,525.

<sup>319</sup> AOC determined that Clark was entitled to recover \$8,318 for this change. R4, COF 4379. Subtracting Clark's 10-percent markup results in \$7,562 due Judd.

January 23, AOC determined that the value of this change was \$8,318. R4, COF 4281. Judd revised its claim to \$29,262 on March 30, 2001 and identified the four starters not covered by AOC's change order. R4, COF 4291. AOC did not change its decision.

As indicated above, Clark, on behalf of Judd, again revised the claim to \$22,870 based upon Mr. Mansfield's analysis of the claim. However, Mr. Mansfield did not detail how he calculated this amount, which is not supported by any additional documentation or calculations.

As indicated above, a portion of this claim--that is, the starter/disconnects for four motors--was not the subject of AOC's change order or the RFIs. These claimed costs could only be recovered under a constructive change theory; that is, the contractor must show the alleged additional work was performed pursuant to government direction or as a result of government fault.

*C.H. Hyperbarics, Inc.*, ASBCA Nos. 49375 *et al*, March 23, 2004, 04-1 BCA ¶ 32,568 at 161,147. A contractor who acts as a volunteer cannot be paid for extra work which is furnished on its own initiative. *Id.* Here, it is apparent that Judd and Clark were fully cognizant as to how this work was to be authorized, given that they had submitted RFIs for motors where they believed starters and/or disconnects were required and declined to perform the work without a change order. Under the circumstances, we consider Judd's work in furnishing and installing these four additional starters and disconnects to be voluntary and thus not compensable. *Id.*; *Calfon Constr., Inc. v. United States*, 17 ClCt 171, 177 ((1989).

AOC asserts that the claim should be denied because no invoice has ever been provided for the starters and disconnects, despite its repeated requests, and the rest of Judd's claimed costs should not be allowed because they are based upon estimated costs.

As indicated above, Mr. Mansfield was accepted by the Board as expert "to audit Judd's scope of work as well as [its] costs." H.Tr., Mansfield, 1:89. For this change claim, Mr. Mansfield made certain adjustments in Judd's claimed costs (which he did not clearly identify) and testified that he believed that the claimed material and labor costs for this change were fair and reasonable. *Id.* at 8:58, 61-62. While we have elsewhere accepted Mr. Mansfield opinion regarding the reasonableness and allowability of Judd's claimed estimated costs for changed work, we do not do so here for a variety of reasons. In this regard, we note that, unlike other changed work for Judd, Mr. Mansfield had no involvement in this change, and did not prepare or assist in the preparation of this estimate or this change claim, and apparently did not talk to anyone who did. *Id.* at 8:50, 67-68. While this does not negate the validity of his supported opinion, it does factor into the weight we give it.

As indicated, the major reason that this claim could not be resolved was that Judd failed to provide an invoice showing the prices for the starters and disconnects, despite being repeatedly requested to do so. Judd still has not provided a detailed invoice. Instead, the record includes a lump sum quote of \$13,480, dated September 28, 2000, from Siemens Energy & Automation for 13 "size 0" and 2 "size 2" combined starter/disconnects. R4, COF 4294. This quantity or amount does not match up to the amount of the change claim, which claims \$9,750 for a

“CB-Panel ‘E1’”<sup>320</sup>, 9 “size O starters”, and 2 “size 2 starters.” R4, COF 4292-93; H.Tr., Mansfield, 8:57, 76-84. Mr. Mansfield testified that he found the claimed \$9,750 cost reasonable because “that package of equipment should add up to around \$10,000.” H.Tr., Mansfield, 8:81. However, he did not explain how he reached this conclusion or provide documentary evidence as to the prices of these items.

With regard to the material and labor costs, Mr. Mansfield did not, as he did for other Judd estimates, perform his own takeoff analysis of the material and labor costs claimed, but only reviewed the contract drawings to ensure that the starters/disconnects included in the change were not for motors for which the contract already showed that starters/disconnects were required. H.Tr., Mansfield, 8:84, 86-87, 89-90. Notwithstanding his limited analysis, Mr. Mansfield concluded without elaboration that the claimed material and labor costs were reasonable.

We find Mr. Mansfield’s limited analysis and testimony insufficient in this case to support the validity of Judd’s estimated claimed costs. Moreover, based upon Mr. Mansfield’s blanket endorsement of the claimed costs, which do not identify what labor and material costs are related to particular starters or disconnects, we find no reasonable way to segregate the costs of those starters/disconnects, and the particular material and labor associated with their installation, that were authorized by the change order from those which were not so authorized.

We are thus left with AOC’s \$8,318 estimate (\$7,562 for Judd) for this changed work. R4, COF 4311. Other than asserting that Judd’s estimate and Mr. Mansfield’s testimony are the best evidence of the value of this change, Clark has not specifically disputed, or provided any evidence showing, that AOC’s estimate is flawed in any particular respect, except to note that this estimate does not include the two starters ordered by RFI No. 482a (as well as those which Clark/Judd voluntarily installed). App. PFF ¶ 843. Mr. Coffey, who testified on AOC’s behalf concerning this change claim, conceded that the two starters ordered by RFI No. 482a and the implementing change order were omitted from the estimate. H.Tr., Coffey, 8:97-98. In the absence of any better evidence, we use the material and labor estimates of DMJM’s/AOC’s detailed estimate to determine the additional costs that Judd should recover for providing and installing these two additional authorized starters. In this regard, the DMJM estimate shows a total material and labor cost of \$524 per size “O” starter, including accessories, for a total material and labor cost for the two starters of \$1,048. R4, COF 4311. After we apply Judd’s 10 percent overhead and profit markups to this figure, we find that Judd is entitled to recover an additional \$1,268 under this change claim.<sup>321</sup>

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<sup>320</sup> Mr. Mansfield testified that this was a three-phase 20-amp breaker for panel “E1,” but did not explain why this was covered by the specific change order issued by AOC, although he stated that this item was needed. H.Tr., Mansfield, 8:80-83.

<sup>321</sup>  $\$1,048 + \$105$  (10% overhead) +  $\$115$  (10% profit) =  $\$1,268$ . As indicated above, AOC has already amended the contract to allow Judd \$7,562 for this change for the other starters and disconnects authorized by the issued change.

#### **XIV. STANDARD IRON'S CLAIMS**

Standard Iron was the subcontractor responsible for the fabrication and installation of the aluminum and steel structure of the conservatory. As set forth in Appellant's revised claim, Standard Iron claims delay damages in the amount of \$210,145 and acceleration damages in the amount of \$234,481. App. Exh. 139, attach. 10. Standard Iron's claims include those made on behalf of itself and those made on behalf of its erection subcontractor, Williams Steel.<sup>322</sup> We will consider the Standard Iron delay and acceleration claims apart from the Williams Steel's delay and acceleration claims. In addition, Standard Iron has submitted a number of change claims that we consider here.

##### **A. Standard Iron Delay Claim**

Standard Iron claims delay damages on its own behalf in the amount of \$72,232, consisting of the following three elements:

Additional Management Time	\$19,798
Additional Engineering Management Time	\$35,675
Material Escalation	\$9,943
<b>Total</b>	<b>\$72,232</b> <sup>323</sup>

App. Exh. 70 at 1, 3. Standard Iron argues that it anticipated that its involvement in the contract would end in December 1999, but that its work was extended by government delays for 10 months from January 2000 through October 2000.

As discussed in detail above, the claimed critical path delay experienced by Standard Iron, which is the basis of this claim, was virtually entirely the responsibility of that firm and Clark. That is, the project was delayed 313 calendar days when Standard Iron's work was the critical path and Clark/Standard Iron was responsible for 295.6 days of that delay and AOC was responsible for only 17.4 days of that delay. In any case, as detailed below, Standard Iron has not reasonably established the allowability of its delay claim.

Standard Iron first seeks \$19,798 for the diversion of management time for its president and project manager for the claimed 10-month delay period. Standard Iron quantified the salaries and benefits for its identified management personnel for the period from January to October 2000, and then divided the number by six, because, "on the average, six jobs are in progress at any given time." App. Exh. 70 at 2. Similarly, Standard Iron also seeks \$35,675 for the diversion of engineering management time, arguing that "[e]ngineering and detailing of this

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<sup>322</sup> Standard Iron's delay claim in the amount of \$210,145 consists of: (1) \$72,232 for Standard Iron itself; (2) \$109,962 for Williams Steel; and (3) \$27,951 for Williams Steel (Remobilization). Similarly, Standard Iron's acceleration claim in the amount of \$234,481 consists of (1) \$65,772 for Standard Iron itself; and (2) \$168,709 for Williams Steel. App. Exh. 70.

<sup>323</sup> Standard Iron fails to explain how its delay claim here totals \$72,232, when the figures upon which it is based only total \$65,416.

project had been going on continuously since award,” and that the subcontractor “had two engineering managers on the payroll since January [2000], both spending a great deal of time on the Botanic Garden.” *Id.* As with the claimed diversion of management time, Standard Iron quantified the salaries and benefits for its two engineering managers for the period from January to October 2000, and then divided the total by the estimated percentage of time each spent working on the Botanic Garden contract.<sup>324</sup> *Id.*

The contract’s No Damages for Delay clause prohibits the recovery of “indirect and/or impact costs” for a government-caused delay, and limits the recovery of the contractor’s direct costs, including those for direct labor, with the proviso “that the accounting practice of treating these costs as ‘direct’ shall be in accordance with (1) the Contractor’s established and consistently followed cost accounting practices for all work, and (2) FAR Cost Accounting Cost Principles and Procedures (FAR Part 31).” R4, K0040. Here, Standard Iron presented no evidence showing that its management expenses were normally treated as direct, as opposed to indirect, costs of contract performance. *See* H.Tr., Torchio, 16:14-16. By contrast, the DCAA audit of Standard Iron found that it was the subcontractor’s practice to “book” management and engineering management salaries to overhead, and that the subcontractor had not deviated from its normal practice here and had in fact charged the management salaries claimed here to overhead. DCAA Audit of Standard Iron at 18-19. As Standard Iron has failed to establish that its management expenses were normally a direct cost, we find that this aspect of the subcontractor’s claim is precluded by the terms of Clark’s contract with AOC.

Standard Iron also claims that the delay caused it to incur a material cost escalation of \$9,943. Standard Iron computed this amount by using its estimated material cost of \$458,895 and assuming an inflation rate of 2.6 percent annually for the 10-month period. Resp. Exh. 70 at 2. We find no merit to Standard Iron’s unsupported assumption that simply because its performance was delayed, the contractor automatically incurred higher material costs. Standard Iron has presented no evidence that its purchase of materials was in fact delayed, no evidence that it actually paid a higher price than originally anticipated for materials, and no evidence that the delay was the cause of higher material costs. The mechanical application of an inflationary index to originally estimated costs is not an acceptable substitute for proving the requisite elements of liability, causation, and resultant injury. *See Servidone Constr. Corp. v. United States*, 931 F.2d at 861; *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199. In sum, Standard Iron’s own delay claims are denied.

### **B. Standard Iron Acceleration Claim**

Standard Iron also claims \$65,772 in acceleration damages, based upon the compression of its schedule for shop production and fabrication of the Palm House structural aluminum during 2000 in accordance with Clark’s written directive of February 11, 2000. C4 Supp. 13 0198, 0224-25; 22 0558; H.Tr., Torchio, 16:20. This acceleration order was apparently in response to AOC’s February 10, 2000 modification of the Botanic Garden contract, which stated:

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<sup>324</sup> Standard Iron estimated that one engineering manager spent one-sixth of his time on the Botanic Garden contract while the second engineering manager spent one-half of his time on the contract. App. Exh. 70 at 2.

In accordance with the requirements of Article 23 of the General Conditions, you are hereby authorized to proceed with overtime work, extended hours during the week and on weekends for the fabrication of the structural aluminum for the Palm House. This authorization is for a not-to-exceed amount of \$40,000. When you have expended \$30,000, notify this office so that we can make a determination on whether ordering additional overtime is required.

C4 Supp. 22 0546. In addition, as discussed above, on April 6, 2000, AOC directed that all areas of the project, except the Palm House, be made suitable for provisional use by December 30, 2000, and that the parties work together regarding an acceptable date for completion of all contract work, which then "appear[ed]" to AOC would be not later than March 31, 2001.

C4 Supp. 22 1711-12. On April 14, Clark in turn directed Standard Iron to accelerate the entire scope of its work for the Botanic Gardens contract and reiterated the same deadlines stated by AOC. C4 Supp. 13 0193.

Standard Iron's claim for \$65,772 here consists of three separate components--overtime labor, additional labor inefficiency, and additional tools and equipment--which it calculated as follows:

<b>Overtime Labor</b>	
Overtime Labor	\$7,947
Overhead (267.47%)	\$21,255
Inefficiency (10%) <sup>325</sup>	\$2,125
Profit (10%)	\$3,133
<b>Total</b>	<b>\$34,460</b>
<b>Additional Labor Inefficiency</b>	
Additional Labor (\$22,579)	
Inefficiency (25% of Additional Labor)	\$5,645
Overhead (267.47%)	\$15,098
Profit (10%)	\$2,074
<b>Total</b>	<b>\$22,817</b>
<b>Additional Tools &amp; Equipment</b>	
Additional Tools	\$7,723
Profit (10%)	\$772
<b>Total</b>	<b>\$8,495</b>

C4 Supp. 13 0198-207.

The bulk of Standard Iron's claim is not allowable. In this regard, as discussed in detail above, we find that any accelerated work performed by Clark and its subcontractors during the Spring of

<sup>325</sup> Standard Iron's calculation of this 10-percent inefficiency factor is obviously erroneous as it is calculated as 10 percent of Standard's overhead costs and was not applied to the actual overtime costs. C4 Supp. 13 0205.

2000 was not performed pursuant to a compensable constructive acceleration order, given the absence of excusable delay under the contract--a prerequisite to finding constructive acceleration. In this regard, we expressly found that the April 6, 2000 directive from AOC did not constitute an actual or constructive acceleration order. Accordingly, Standard Iron's right to recover acceleration costs here must be premised upon the specific acceleration order issued by AOC on February 10, 2000. As noted, that acceleration order only authorizes "overtime work, extended hours during the week and on weekends" for the fabrication of the structural aluminum for the Palm House," in an amount not to exceed \$40,000.<sup>326</sup> C4 Supp. 22 0546.

Thus, Standard Iron's recovery for acceleration costs here is limited to its labor overtime costs, which were both authorized by AOC and sufficiently proved by the subcontractor.<sup>327</sup> We find Standard Iron's records sufficiently demonstrate that the subcontractor incurred a total of \$6,267 in overtime labor costs for the shop production and fabrication of the Palm House structural aluminum subsequent to AOC's February 10, 2000 overtime authorization (*i.e.*, for the week ending February 13 through the week ending April 16, 2000). C4 Supp. 13 0200-06.

Standard Iron also claims an overhead rate of 267.47-percent to be applied to its overtime costs as part of its overtime labor claim. In conducting its audit of Standard Iron, DCAA found the subcontractor's unaudited actual overhead rate for fiscal year ending September 30, 2000 was 267 percent. DCAA Audit of Standard Iron at 32.

However, DCAA found the overhead amount claimed by Standard Iron was unallowable by the terms of Standard Iron's subcontract agreement with Clark. *Id.* at 26. In this regard, Standard Iron's subcontract with Clark stated in relevant part that "[w]hen change orders arise between [Standard Iron] and Clark, charges shall be at cost without markup for overhead or profit." Standard Iron Subcontract Agreement, exh. D, at 3.

In ascertaining the meaning of the contract here, we necessarily look to the particular language at issue, as well as the language and design of the contract as a whole. We find "change orders aris[ing] between Subcontractor and Clark" to reasonably mean only those initiated by the prime contractor, and not also those actual and constructive change orders initiated by the government and passed through Clark to Standard Iron.<sup>328</sup> We find the language in question here was

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<sup>326</sup> The record is unclear if Standard Iron was made aware of the pertinent details of AOC's authorization: that it was limited to overtime and extended-hour work up to \$40,000. While Clark represented to AOC that it had directed Standard Iron to proceed within the limits of the not-to-exceed amount, C4 Supp. 22 0559, Clark's directive to Standard Iron did not include a not-to-exceed amount, but instead reiterated Standard Iron's order of magnitude estimate of approximately \$85,000. C4 Supp. 22 0558.

<sup>327</sup> Standard Iron submitted its job history report for the Botanic Garden contract, showing the names, dates, rates, and amounts of labor performed by its workforce. C4 Supp. 13 0208-22. Standard Iron also prepared charts summarizing the weekly amounts of overtime labor and additional labor expended for shop production and fabrication work on the Palm House structure. C4 Supp. 13 0200-06.

<sup>328</sup> If the phrase "when change orders arise between Subcontractor and Clark," were read in complete isolation from the subcontract as a whole, then it would preclude Standard Iron's recovery of overhead and profit, even where the incorporated Botanic Garden contract would otherwise permit their recovery.

intended for the benefit of a party to the subcontract agreement (*i.e.*, Clark), and not AOC, and does not preclude Standard Iron's recovery of its overhead markup for this AOC directed change.

We also conclude that the terms of the prime contract between Clark and AOC, incorporated into Standard Iron's subcontract, do not limit Standard Iron's recovery of overhead here. As set forth above, the Official Procedure for Making Changes in Contracts provision generally limits a first-tier subcontractor's allowance for overhead to 10 percent. R4, K0189. However, the clause also makes express exception for "changes which include custom items unique to the project, which are fabricated off-site." *Id.* In such circumstances, the fabricator, whether the contractor or subcontractor at any tier, is not limited to a 10-percent overhead allowance, but is governed only by the provision that the overhead claimed be consistent with the FAR cost principles. *Id.* We find that the structural aluminum members fabricated by Standard Iron constituted custom items unique to the project within the meaning of the clause here. Thus, Standard Iron's use of the 267.47-percent overhead rate is allowable.

The remainder of Standard Iron's acceleration claim is denied. Specifically, the acceleration order did not authorize the claimed additional tools and equipment costs and we therefore find these costs are not recoverable.<sup>329</sup>

Standard Iron also claims a 10-percent inefficiency factor as part of its overtime labor claim<sup>330</sup> as well as a 25-percent inefficiency claim based on its additional labor that it needed to employ to accelerate the work.<sup>331</sup> It is not clear to the Board that the limited authorization by AOC for "overtime work, extended hours during the week and on weekends" provides a basis for the recovery of the claimed inefficiency costs. We need not resolve this issue because Standard Iron has failed to reasonably support its inefficiency claims, so as to permit their recovery. As observed by the Court of Claims,

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<sup>329</sup> This aspect of the claim, which consists of a one-page summary of various equipment types, hours employed, and rates, was not reasonably supported by the conclusory evidence presented in any case. *See* C4 Supp.13 0207; H. Tr., Torchio, 16:22-23.

<sup>330</sup> As noted this factor was erroneously applied against only the overhead portion of the labor overtime claim. The only support for this inefficiency claim was the testimony of Mr. Torchio as follows:

A: We applied a 10-percent overtime inefficiency [sic] . . .

Q: What's your basis for that?

A: Industry practice and our experience that men are less efficient when they're worked over 8 hours.

H.Tr., Torchio, 16:21.

<sup>331</sup> Standard Iron described this component of its acceleration claim as: "This is manpower added to the base crew. We had figured a crew of four men was required to fabricate the structural aluminum efficiently, and this component covers the inefficiency of adding men above the four required." C4 Supp. 13 0224; *see* H.Tr., Torchio, H. Tr., 16:21-22.

It is a rare case where loss of productivity can be proven by books and records; almost always it has to be proven by the opinions of expert witnesses. However, the mere expression of an estimate as to the amount of productivity loss by an expert witness with nothing to support it will not establish the fundamental fact of resultant injury nor provide a sufficient basis for making a reasonably correct approximation of damages.

*Luria Brothers & Co., Inc. v. United States*, 177 Ct. Cl. 676, 696, 369 F.2d 701 (1966); see *Sauer, Inc.*, ASBCA Nos. 39605, 39898, July 20, 2001, 01-2 BCA ¶ 31,525 at 155,632-33. The support commonly relied upon for identifying and measuring labor inefficiency is a comparison to some accepted standard. *Herman B. Taylor Constr. Co.*, GSBCA No. 15421, July 21, 2003, 03-2 BCA ¶ 32,320 at 159,503-04; *DANAC, Inc.*, ASBCA No. 33394, July 31, 1997, 97-2 BCA ¶ 29,184, at 145,152, *recon. denied*, 98-1 BCA ¶ 29,454. Where a claim of labor inefficiency is based on assumptions that are not supported by reliable empirical data, the claim of labor inefficiency will be denied for insufficient proof. *Herman B. Taylor Constr. Co.*, *supra*, at 159,504. Here, Standard Iron provided no expert witness testimony or a comparison to some accepted standard for its claimed labor inefficiencies, and we therefore reject its inefficiency claims because no probative evidence has presented that would support recovery.

In sum, Standard Iron is entitled to recover \$6,267 in allowable overtime direct labor costs for the shop production and fabrication of the Palm House structural aluminum; a 267.27-percent overhead applied to that amount, that is, \$16,762; and a 10-percent markup (\$2,303). We thus find that that Standard Iron is entitled to recover \$25,332 of its acceleration claim.<sup>332</sup>

### C. Williams Steel Delay Claims

Standard Iron also claims a total of \$137,913 in delay damages incurred by its subcontractor, Williams Steel, including Standard Iron's applicable markups. C4 Supp. 08 00805, 00827. This claim is based upon two separate invoices from Williams Steel, one for the damages allegedly incurred due to the 10-month delay in the project schedule and the other representing the costs of remobilizing a crane Williams Steel was using to erect the structural aluminum and steel.<sup>333</sup> C4 Supp. 08 0806, 0828.

#### 1. Project Schedule Delay Claim

In a one-page letter to Standard Iron on June 2, 2000, Williams Steel stated:

Our charges for costs incurred due to a 10 month delay in the project schedule is [sic] as follows:

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<sup>332</sup> \$6,267 + \$16,762 + \$2,303 = \$25,332.

<sup>333</sup> Standard Iron at one time characterized the Williams Steel (Remobilization) claim as one for acceleration damages. App. Exh. 70. However, it is clear that this claim is actually for delay damages.

Increased Foreman's Wages	\$16,137
Increased Labor Burden Costs	\$2,449
Increased Equipment & Supply Costs	\$2,006
Additional Direct Costs	\$28,397
Additional Direct Management Costs	\$33,626
Subtotal	<u>\$82,615</u>
10% overhead	\$8,262
Subtotal	<u>\$90,877</u>
10% profit	<u>\$9,088</u>
Total	<u>\$99,965</u> <sup>334</sup>

C4 Supp. 08 00806.

We find that this claim is not sufficiently supported. We first note that it is unclear if Williams Steel's claim, prepared after the delay period but before completion of the erection work, represents the company's actual or estimated costs. Williams Steel provided no additional documentation other than its invoice to explain or support its claimed delay damages, and no representative of Williams Steel testified at the hearing. Further, Mr. Torchio, who testified on Williams Steel's behalf, was not personally knowledgeable about the facts, circumstances, and details of Williams Steel's delay claim, and stated that he did not know what labor costs were involved in Williams Steel's increased labor burden costs, what the particular equipment and supply costs were that allegedly increased, what or when additional direct management costs were expended, or what comprised the additional direct costs claimed.<sup>335</sup> H.Tr., Torchio 16:41-42. Given the complete absence of probative evidence with respect to the incurrence and assembly of the costs compiled, we find Williams Steel's cost summary insufficient to support recovery of these claimed delay costs. See *Minority Enterprises, Inc., supra*, at 136,830.

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<sup>334</sup> To this amount Standard Iron added its 10-percent profit markup of \$9,997 for a total claimed amount here of \$109,962 (\$99,965 + \$9,997 = \$109,962).

<sup>335</sup> The following exchange between Appellant's counsel and Standard Iron's representative regarding Williams Steel's delay claim is enlightening:

Q: Mr. Torchio, have you taken any steps to verify these numbers from the subcontractor?

A: I contacted both Chuck Mungolo and Mike Allen, Vice President of Williams Steel Erection and verified that these were their costs, and they stood behind them.

Q: Do you know where they derived their numbers?

A: No.

Q: Do you know if they reviewed their payroll records and their invoicing to get the –

A: I asked them to, and they said that they had reviewed their costs.

H.Tr., Torchio, at 16:18-19.

## 2. Crane Remobilization Claim

Standard Iron also seeks the expenses incurred by Williams Steel in remobilizing a crane. The crane to be used for the installation of structural aluminum and steel was demobilized because Williams Steel ran out of structural material to erect; the crane was remobilized when there was sufficient material on site to allow it to continue erection. H.Tr., Torchio, 16:26. In addition, because of this delay, Williams Steel had to rent a manlift and forklift to complete erection of the Palm House structural aluminum and catwalk. *Id.* This remobilization was assertedly due to delays in preparing the shop drawings caused by AOC's failure to earlier resolve design issues, which in turn delayed Standard Iron's shop production and fabrication of various parts of the Palm House structure.

On July 20, 2000, Williams Steel provided Standard Iron with a summary of its remobilization costs, totaling \$25,410. C4 Supp. 08 00828. To this total, Standard Iron added a 10-percent overhead and profit markup of \$2,541 for a total claimed here of \$27,951. C4 Supp.08 00827.

We discussed the delay that led to the remobilization of the crane in Period 3 above, where we found that this delay was neither AOC's responsibility nor compensable, because Clark had failed to demonstrate that the delay was caused by the untimely fabrication of the structural aluminum due to design deficiencies. Accordingly, we find Williams Steel is not entitled to recover the claimed remobilization costs. The fact that Williams Steel (and Standard Iron) incurred additional costs for a second unplanned remobilization effort is an insufficient basis to recover such costs from AOC without showing the prerequisite government liability.

### D. Williams Steel Acceleration Claim

Standard Iron also claims acceleration damages totaling \$168,709 on behalf of Williams Steel plus Standard Iron's markup. C4 Supp. 08 00808. These acceleration costs were also assertedly incurred pursuant to the Clark acceleration order to Standard Iron in April 2000 (discussed above). C4 Supp. 13 0193.

On April 5, 2000 (before undertaking any acceleration), Williams Steel provided Standard Iron with an estimate for its acceleration, or compression, for the erection of the Palm House structure. C4 Supp. 13 0190-91. Williams Steel's letter stated:

Our price for escalation of erection from 4 months to 3 months, based on 260 hours of available overtime, is . . . \$153,372. The breakdown for Standard Iron and Clark Construction's use is as follows:

Superintendent	\$4,033
Foreman	\$7,587
Ironworkers	\$43,906
Operators	\$8,365
Upgrade Crane Size (\$1,300 per day x 44 days)	\$57,200
Additional Manlift (\$900 per week x 13 weeks)	<u>\$11,700</u>

Subtotal	\$132,790
Overhead (10%)	\$13,279
Profit (5%)	<u>\$7,303</u>
Total	\$153,373

*Id.*

This claim lacks merit for a variety of reasons. First, as discussed in detail above, this alleged acceleration in April 2000 was not in response to either a specific or constructive acceleration order by AOC. Without such an order, these acceleration costs cannot be recovered.

Second, while Standard Iron's representative testified that Williams Steel was directed to compress erection of the Palm House structure from 4 months to 3 months, H.Tr., Torchio, 16:24-25, it is not clear whether Williams Steel in fact accelerated its work. In this regard, Williams Steel's foreman for the renovation project did not recall that the company in fact accelerated its work prior to the truss lacing angle repairs (in December 2000). D.Tr., Jones, 22-23.

Finally, we find that Appellant has failed to adequately substantiate this claim in any case. Williams Steel's submission, prepared in advance of its erection work, represents the subcontractor's estimated pricing proposal and not its actually incurred costs for any acceleratory effort. H.Tr., Torchio, 16:50. Williams Steel provided no additional documentation either before or after it completed the Palm House erection work to support its estimate, and no Williams Steel representative testified or explained its claim at the hearing. While Mr. Torchio testified that he had discussed the claim with two Williams Steel employees and believed the estimate to be "proper, fair and reasonable," H.Tr., Torchio, 16:25-26, he provided no proof for the assumption that a 1-month acceleration necessarily resulted in the use of all available overtime (*i.e.*, 260 hours) or proof for the representation that additional and upgraded equipment resulted in higher costs (*e.g.*, if the additional equipment was actually rented).

#### **E. Standard Iron's Additional Engineering, Clark Change Order No. 810421**

This claim has two separate components. First, Standard Iron claims \$27,314 (\$24,831 plus its 10-percent markup) for excess detailing costs assertedly resulting from AOC's defective designs. H.Tr., Torchio, 15:302. Second, Standard Iron claims \$36,850 (\$33,500 plus its 10-percent markup) to compensate it for sums it paid O'Connell and Lawrence Inc. for an engineering analysis performed as a result of the February 5, 2001 cure notice. App. Exh. 68.

##### **1. Excess Detailing Costs**

This claim is for excess detailing costs resulting from AOC's assertedly defective designs. Standard Iron states that Standard Iron estimated \$134,460 in detailing costs for this project, but that the detailing ultimately cost Standard Iron \$195,511, an overrun of \$61,051. H.Tr., Torchio, 15:300; C4 Supp. 13 0233. This figure approximated the \$63,630 initially claimed as the

overrun by Standard Iron.<sup>336</sup> C4 Supp. 13 0235. As a result of conversations with DCAA in its audit of Standard Iron's claim, it was brought to Standard Iron's attention that this claim included amounts reimbursed under approved change orders and which were elsewhere claimed by Standard Iron. H.Tr., Torchio, 15:300-01; DCAA Audit of Standard Iron at 7-8. Because of the approved change orders, Standard Iron increased its estimated cost for detailing costs from \$134,460 to \$141,985, which had the effect of lowering the claim by \$7,525. H.Tr., Torchio, 15:300-01. In addition, to account for the amounts claimed for detailing in pending change requests, Standard Iron subtracted an additional \$28,695 from the amount claimed. *Id.* at 15:302. The foregoing adjustments resulted in the \$24,831 (plus markup) in excess detailing costs now claimed. *Id.*

As pointed out by AOC, this claim has been presented on a total cost basis, but Appellant has not presented sufficient evidence to establish that it satisfied any, much less all, of the four-part prerequisites before the recovery of damages under this approach will be permitted: (1) the nature of the particular cost is impossible or highly impracticable to determine with a reasonable degree of certainty; (2) the contractor's bid was realistic; (3) the contractor's actual incurred costs were reasonable; and (4) the contractor was not responsible for any of the added costs. *WRB Corp. v. United States*, 183 Ct. Cl. at 426; *Propellex Corp. v. Brownlee*, 342 F.3d at 1338. Clark does not deny that this claim is on a total cost basis. *See App. Reply Brief* at 86-88.

With regard to the first part, while Mr. Torchio testified that Standard Iron did not track changed work costs separately from its regular contract costs, H.Tr., Torchio, 16:183-84, he did not testify that it was impossible or highly impracticable to track detailing costs by change order. Moreover, even though the majority of the costs incurred were for A&N's services, C4 Supp. 13 0235, and A&N's cognizant representative, Mr. Miranda, testified at the hearing, as detailed below, A&N has presented no evidence as to whether actual cost data was available to track its change order work or why A&N's actual costs could not be tracked.<sup>337</sup>

With regard to the second prerequisite part, there is no evidence indicating that Standard Iron's original \$134,460 estimate for detailing costs was realistic. Mr. Torchio had no knowledge as to how these costs were estimated on this project. H.Tr., Torchio, 16:119-20. We note that while the estimate was based upon the assumption that almost all of the detailing work would be done in-house, only \$33,684 of the detailing was actually done in-house with the rest being contracted out, primarily to A&N. C4 Supp. 13 0235. In any event, as discussed above, the record evidences that Clark and Standard Iron may have underestimated the effort needed to prepare shop drawings as they did not account for performing the contractually required as-built survey before preparing the drawings and satisfying the contractual obligation to coordinate the shop drawings with Rough Brothers. *See H.Tr., Torchio*, 15:254.

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<sup>336</sup> Mr. Torchio was unable to explain the discrepancy between the \$63,630 claimed and the \$61,051 overrun shown. *See H.Tr., Torchio*, 16:121; C4 Supp. 13 0235.

<sup>337</sup> In fact, we have below disallowed A&N's claimed detailing costs in Clark Change Order No. 810163 because of Appellant's failure to produce evidence of actual costs or demonstrate that the estimated costs were reasonable.

With regard to the other two parts, as discussed above, the record evidences that A&N's detailing costs were increased because of Clark/Standard Iron's belated and faulty compliance with the requirement to perform an as-built survey before preparing drawings. For example, as we found above, this initial survey contained an orientation error in the survey that caused A&N to have to redraw work that it had done before A&N realized the error. A4 Supp. R00227.

Thus, while the record evidences that Standard Iron detailing costs were higher than estimated in part because of AOC's defective designs, H.Tr., Miranda, 17:135, 138, Appellant has provided no basis to allow recovery of its claimed costs here.

## **2. O'Connell and Lawrence Costs**

Standard Iron claims \$33,500 plus its 10-percent markup (\$36,850) for costs paid O'Connell & Lawrence for engineering advice in response the February 5, 2001 cure notice. O'Connell & Lawrence was engaged after the cure notice identified three instances where Standard Iron's installation of the Palm House structural aluminum structure was not in compliance with the contract requirements: (1) reduction of the number of lacing angles in trusses AA, AB, AC from 19 to 17; (2) reduction of the thickness of the aluminum lacing angle plate in truss AA from one-half inch to three-eighths inch; and (3) use of unapproved splice (butt) welds in the arch trusses. H.Tr., Torchio, 15:303-04; App. Exh. 52.

Mr. Torchio testified that he did not participate in selecting O'Connell & Lawrence for this work, but he understood that the results of its analysis were reviewed and communicated to Mr. Bass of Standard Iron, and that this analysis confirmed SGH's analysis (discussed above) that indicated that these noncompliances did not materially affect the integrity of the structure. H.Tr., Torchio, 16:129-30. The record showed that O'Connell & Lawrence did not perform this work itself, but the claimed costs were for a "subconsultant," who Mr. Torchio could not identify, and that Mr. Torchio was aware of no written report by O'Connell & Lawrence or the subconsultant. *Id.* at 15:284; 16:129-33. Mr. Torchio provided no testimony concerning the reasonableness of the claimed charges.

This claim is denied. Not only has Standard Iron not established the reasonableness of the claimed costs, but it has not shown that they were the result of a constructive change by AOC. In this regard, no written report was apparently produced documenting the unidentified subconsultant's analysis. Moreover, as discussed above, the fact is that regardless of whether the Standard Iron's failure to comply with the specification requirements materially affected the integrity of the structure, its design was in fact noncompliant in the respects noted by AOC. We find no reason that AOC should reimburse Standard Iron for the investigation of the materiality of that firm's failure to comply with the specification requirements.

## **F. Palm House/Garden Court Expansion Joint Change, Clark Change Order No. 810238**

This claimed change is based upon Clark's assertion that the contract design drawings did not provide a design for the structural support needed for an expansion joint between the Palm

House and Garden Court, and that providing this support constituted a change to its contract. This change relates to Clark's claimed delay during Periods 2 and 3 (discussed above).

The Palm House and Garden Court are two separate, stand-alone structures separated by a space of approximately one foot eight inches. The expansion joint fills the space between the two buildings and is designed to expand and contract; it consists of two aluminum channels (one channel attached to each building with a gap of approximately two inches between the two channels) over which sits an aluminum expansion cover. *See* R4, 9310, 9313. To attach the expansion joint to the Palm House and Garden Court, a curved aluminum tube was designed by Rough Brothers and DMJM, and provided by Standard Iron. Clark argues that providing and installing this aluminum tube support for the expansion joint was a change to its contract and claims \$33,855 on behalf of Standard Iron. App. PFF ¶¶ 1029, 1030.

It is undisputed, and the record otherwise shows, that the contract structural and architectural drawings did not show the necessary expansion joint between the Palm House and Garden Court. *See* H.Tr., Witt, 19:104-05; R4, Drawing No. S203; Resp. Exh. 21. AOC argues that it was Clark's responsibility to design and provide the expansion joint, including all necessary connections to the Palm House and Garden Court, under section 13123 of the contract. Clark does not dispute that it was Clark's responsibility under the contract to design and provide the expansion joint as part of the glazing system. However, Clark argues that the structural elements needed to attach the expansion joint (that is, the aluminum support tube that was ultimately provided) is a part of the structural aluminum for which AOC retained design responsibility under section 05140 of the contract. *See* App. PFF ¶ 1029.

Section 13123 "specifies [a] custom heavy duty quality aluminum framed glass enclosed conservatory." R4, K00897. As discussed above, section 13123 is a performance specification, which required Clark to design and provide a glazing system for the conservatory meeting the specified performance goals and characteristics. Among other things, section 13123 required Clark to provide as part of this complete glazing system suitable "expansion joints," which the Board finds includes the expansion joint between the Palm House and Garden Court. R4, K0900. Section 13123 also required Clark to provide "[i]nstallation of the entire system, including all ancillary connections, methods of attachment of equipment to the structure and incidental metalwork," R4, K0897, and to provide shop drawings "[c]learly indicat[ing] the anchorage system, methods of interface with the building construction, field welding, if required, and provisions for expansion and contraction." R4, K0901. In contrast to section 13123, section 05140, which, as discussed above, is a design specification governing the provision of structural aluminum, does not discuss or show the Palm House/Garden Court expansion joint or its connection to the structure.<sup>338</sup>

Despite the unambiguous language in section 13123, Clark asserts that the structural support for the expansion joint should have been identified in the contract design drawings because it was more akin to structural aluminum than the glazing system. The contract does not make the distinction argued for by Clark. Instead, under the glazing system performance specification, it

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<sup>338</sup> In this regard, AOC noted to Clark, in responding to RFI No. 507 on July 6, 2000, that "it is not customary to provide glazing details on structural drawings." R4, COF 3863.

was Clark's responsibility to design, fabricate, and install the expansion joint, including all means of attachment to the structure. To the extent that Clark was required to also design and provide an aluminum tube, to which the expansion joint would attach, we find that this connection was required under the glazing system performance specification included in this contract. In this regard, we again note that it was Clark's obligation to provide a custom-designed glazing system, including expansion joints and ancillary connections. See H.Tr., Witt, 19:104-05 (Rough Brothers does not have an off-the-shelf expansion joint).

Even were we to accept Clark's argument that the curved aluminum tube is more akin to structural aluminum that should have been governed by the structural aluminum design specification, we note that the complete absence of any design for this expansion joint support, the provision of which is undisputedly necessary, indicates that provision of this support was left to Clark's judgment. Rather than being a defective design, as Clark contends, we find that the expansion joint support was left to Clark to design. See *Penguin Industries, Inc. v. United States*, 209 Ct. Cl. 121, 125, 530 F.2d 934, 936-37 (1976) (where detailed design specification did not specify a method of applying glue, this was left to the contractor to use its own judgment, experience and know-how); see also *J.W. Bateson Co., Inc., supra*, at 31,560 (contract need not show every detail in drawings but rather only give contractor sufficiently clear notice of requirements and obligations).

As the United States Claims Court has noted, the "contract must be given the meaning which a reasonably intelligent person would derive from the contract language." *G.M. Shupe, Inc. v. United States*, 5 Cl. Ct. at 708. Here, we find that a reasonably intelligent and experienced contractor, such as Clark, could not assume that the absence of this information in the design drawings excused it from any responsibility for providing the expansion joint and its ancillary attachment, as required by the unambiguous performance specification included in the contract.

Clark nevertheless argues that AOC and DMJM agreed to provide, and did provide, a design for the expansion joint connection, which Clark argues makes AOC responsible for this design as a constructive change.

The record shows that at an April 7, 1999 meeting at DMJM's offices, DMJM agreed to "provide clarifying details" for the Palm House/Garden Court expansion joint. C4 Supp. 21 0839. Subsequently, DMJM provided preliminary information about the Palm House and Garden Court interface on September 28, 1999, see C4 Supp.21 2574, and Clark acknowledged receiving "bootleg details" regarding the expansion joint but noted that clarification was needed. See C4 Supp. 21 2507. On December 3, 1999, DMJM issued a drawing package that it stated "reflects changes in the Palm House/Garden Court interface" and the "package is provided to show design intent for the resolution of the interface expansion. Final design responsibility is the responsibility of the Contractor in accordance with specification section 13123." C4 Supp. 21 2995; A4 Supp. R00376.

However, in lieu of DMJM's design, Rough Brothers proposed a curved tube member to support the Palm House/Garden Court expansion joint. In an RFI dated June 22, 2000, Rough Brothers stated that the "reasons for suggesting this member in lieu of the broken channels shown by DMJM was to provide a cleaner transition at the 90° turn from the Garden Court south wall

toward the Palm House near the expansion joint from the ground or sill elevation up to about the Garden Court gutter elevation.” R4, COF 3866-69. Rough Brothers’ RFI was forwarded to AOC by Clark as RFI No. 507, with the request that AOC “confirm that the curved tube members are acceptable.” R4, COF 3864. AOC responded to Rough Brothers’ RFI, stating that Rough Brothers’ solution differed from DMJM’s proposed solution but appeared adequate; AOC also noted that this work remained Clark’s responsibility as part of the glazing system. R4, COF 3863. Clark decided to use Rough Brothers’ curved tube design solution for the expansion joint. *See* A4 Supp. R00378.1, Standard Iron Letter to Clark, July 27, 2000, (“I understand we are to use the design generated by Rough Brothers and not to rely on AOC’s design to detail and fabricate the structural elements at the expansion joint.”) On August 4, 2000, DMJM issued sketches to Clark reflecting Rough Brothers’ and Standard Iron’s design for the Palm House/Garden Court expansion joint, stating that these “sketches were drafted by DMJM to expedite the resolution of this issue.” R4, COF 3846-50.

The Board does not find from its review of the record that AOC directed Clark to use a particular design for connecting the expansion joint to the Palm House and Garden Court. Rather, the record shows that, consistent with the performance specification, this choice was left to Clark. In order to show a constructive change, as is claimed here, Clark must show that the change is one that AOC ordered Clark to make. That is, AOC must have by words or deeds ordered Clark to perform work, not required by Clark’s contract. In this regard, suggestions and advice that a contractor chooses to follow do not constitute a compensable change order. *See Singer Co., Librascope Div. v. United States*, 215 Ct. Cl. at 288; *O’Neal Constr. Co.*, ENGBCA No. 5038, June 25, 1987, 87-2 BCA ¶ 19,935 at 100,890; *Quality Plus Equip., Inc.*, ASBCA No. 46,932, September 30, 1996, 96-2 BCA ¶ 28,595 at 142,759-60. Here, Clark has not shown that it was ordered by AOC to use the clarification designs provided by DMJM in August of 2000.

339

Accordingly, we find that providing the curved tube member for the expansion joint was required by Clark’s contract and deny Clark’s/Standard Iron’s request for an equitable adjustment for this work.

#### **G. East and West Transition House Change, Clark Change Order No. 810133**

Clark claims that on January 20, 2000, AOC issued new design drawings for the East and West Transition Houses and that this was a constructive change to Clark’s contract, for which Clark was entitled to an equitable adjustment of \$23,574 on behalf of itself (\$500) and Standard Iron (\$23,074) (not including Clark’s 10-percent overhead/profit markup).<sup>340</sup> R4, 5634. This change also relates to Clark’s claimed delay during Periods 2 and 3 discussed above.

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<sup>339</sup> We note that while Clark’s revised claim states that this change order is in the amount of \$22,067, App. Exh. 139, attach. 8, the evidence referenced at the hearing indicates that the amount actually being sought here is \$23,574.

<sup>340</sup> We note that while Clark’s revised claim states that this change order is in the amount of \$22,067, App. Exh. 139, attach. 8, the evidence referenced at the hearing indicates that the amount actually being sought here is \$23,574.

It is not disputed that AOC/DMJM issued new drawings that changed the design of the transition houses and that AOC indicated at that time that a change order would be forthcoming. R4, COF 4264. AOC contends, however, that the East and West Transition Houses are “entirely glass and aluminum” and are therefore part of the conservatory system for which Clark is responsible. AOC also contends that under amendment No. 9, attachment 4, to the contract, Clark was required to “revise the contract drawings for the roof plans and elevations,” and therefore Clark was responsible for revising the transition house designs but failed to do so. In short, AOC contends that it was Clark’s responsibility to redesign the East and West Transition Houses to accommodate Rough Brothers’ glazing design, and that this responsibility was not abrogated by AOC’s/DMJM’s willingness to provide a new design. Resp. PFF part 5, tab II, at 5-6.

The record does not establish why the design for the East and West Transition Houses was changed, only that the design was changed by AOC/DMJM. R4, COF 4264. For example, Mr. Sullivan and Mr. Witt of Rough Brothers testified that they did not know why the transition house design was changed. H.Tr., Sullivan, 4:150; D.Tr., Witt, 51-53. Contemporaneous documents indicate that the design for the transition houses was incomplete. *See, e.g.*, A4 Supp. R00235 (“all parties agreed” that contract documents had insufficient detail with respect to the transition houses); C4 Supp. 15 0224-26 (DMJM agreed to look at the design of the transition houses); C4 Supp. 21 2728-29 (meeting agenda that includes the East and West Transition House design issue). In fact, this incomplete design was one of the asserted design defects referenced by Clark in requesting extensions to the contract completion date. R4, LTR 5559, LTR 5585. Thus, it appears that this change may well have caused by the drawings’ failure to provide appropriate details, although regardless of the reason, a change in the design of the East and West Transition Houses was in fact made. *See* H.Tr., Sullivan, 4:164-65.

As noted above, AOC asserts that Clark is responsible for the design of the East and West Transition Houses, apparently arguing that these houses are part of the glazing system that Clark was to provide. However, the contract design drawings provided a design for the East and West Transition Houses showing structural members for the transition houses for which AOC was responsible under section 05140 of the contract, and here the record suggests that the AOC design was incomplete. *See* R4, Drawing S203.

AOC’s argument that Clark was responsible for the redesign of the East and West Transition Houses under amendment No. 9, attachment 4, similarly lacks merit. As described above, the primary effect of amendment No. 9, attachment 4, upon contract performance was to require Clark to replicate the glass size originally existing in the Botanic Garden, that is, to reduce the glass size from four-foot squares, as originally solicited, to two-foot squares. This amendment also required Clark “[a]s part of the submittal process, . . . to revise the issued contract drawings for the roof plans and elevations to reflect the revised glass size.” R4, K1847. Although AOC argues that the transition house design change was the result of the revision to the glass size by this amendment and therefore the redesign of the transition houses was Clark’s responsibility, AOC also does not point to any documentary evidence or testimony establishing that this was the case or that the change was requested by Rough Brothers to accommodate its glazing system.<sup>341</sup>

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<sup>341</sup> The Board recognizes that Michael Brainerd of DMJM testified that the transition house design was changed “in efforts to simplify that design in discussions with Rough Brothers to make it a simpler

We find that Appellant is entitled to an equitable adjustment for the change in the structural drawings for the East and West Transition Houses. Standard Iron is entitled to recover \$23,074 (with overhead and profit markups) as its claim is supported by detailed worksheets comparing the material, fabrication, engineering and erection amounts and costs for both the original work and the changed work, and quantifying the difference as the amount sought. R4, COF 5636-38; see H.Tr., Torchio, 4:173-75. Clark is entitled to recover \$500 for a design feasibility review conducted by TGB Consultants because it was a necessary and allowable expense of the AOC-directed change order. R4, COF 5634, 5639; H.Tr., Sullivan, 4:134.

#### **H. Palm House Wall Purlins, Clark Change Order No. 810302.**

Standard Iron claims \$18,123 for installing 6-inch purlins (here also known as girts, H.Tr., Sullivan, 3:334) in the walls of the Palm House instead of 5-inch purlins. App. Exh. 20; H.Tr., Torchio, 3:373.

After some relevant communications between the parties, Standard Iron fabricated 5-inch purlins for the Palm House walls before it submitted its shop drawings. AOC then stated that 6-inch purlins were required by the contract. Appellant asserts that the contract was ambiguous as to whether 5-inch or 6-inch purlins were required, and that it clarified this matter with AOC before the 5-inch purlins were fabricated. Appellant thus argues that the requirement that it provide 6-inch purlins constituted a constructive change to the contract. App. Reply Brief at 111-12.

The purlins in question here are for the “far-west and far-east walls” of the Palm House (and two short sections on the south wall of the Palm House). H.Tr., Sullivan, 3:344-45; R4, Drawing S203 (as marked by Mr. Sullivan). These east and west walls run north/south and intersect the Garden Court on the north side. R4, Drawing S203 (as marked by Mr. Sullivan).

Here, the structural drawings indicate that 6-inch purlins “(typical)” are required for the walls of the Palm House. R4, Drawing S401, detail R1. However, the architectural drawings show a 5-inch purlin for the Palm House walls, at least at the north side where the Palm House walls intersected the Garden Court. R4, Drawing A5036, detail R4.

RFI No. 391 was submitted by Clark on March 20, 2000, asking AOC whether 5-inch wall purlins could be used in the “Palm House Lean-to bay” to match those in the “Garden Court bays.”<sup>342</sup> R4, COF 4324. In response to this RFI, DMJM/AOC stated on March 28 that 5-inch “wall girts are acceptable.” *Id.* This RFI resulted from a discussion of the design issues concerning the general area where the Palm House walls intersected the Garden Court. *See*

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design, that we would provide revised framing details.” H.Tr., Brainerd, 28:79-80. Mr. Brainerd did not testify, however, that the design was necessitated by the glass size revision. Moreover, in response to cross-examination, Mr. Brainerd could not say that the original design was unworkable, only that the redesign was done to “make it easier for them.” *Id.* at 28:198.

<sup>342</sup> The lean-to structures paralleled the length of the Palm House walls in question here and Mr. Sullivan testified that the referenced “lean to bays” concerned the Palm House walls in question here. H.Tr., Sullivan, 3:334, 344-45; R4, Drawing S203.

H.Tr., Sullivan, 3:347-49, 355-56, 364-69. As a result of a subsequent July 27 meeting concerning Garden Court/Palm House issues, DMJM prepared revised drawings on July 31, including RD 68A that showed 5-inch wall purlins for the Palm House walls. R4, 10568, 10575.

On December 13, Standard Iron submitted its shop drawings showing 5-inch wall purlins for the Palm House walls. R4, SI00263-64. On December 20, AOC rejected the submission, stating, "Contract drawings call for 6" purlins (typical)." R4, SI00261. After an exchange of communications where Clark asserted that AOC had previously approved the use of 5-inch wall purlins and AOC requested "engineering calculations" from Clark showing that 5-inch purlins could be used in these walls, R4, 10558-60, 10564-65, 10568-69, COF 4327, Standard Iron submitted revised shop drawings on March 6, 2001, showing 6-inch purlins for the Palm House walls, which DMJM approved on March 9. R4, SI00256, SI00258. Standard Iron proceeded to fabricate and install the 6-inch purlins. H.Tr., Sullivan, 3:343. The already fabricated 5-inch purlins "were trashed." *Id.*

In response to Clark's request for an equitable adjustment, the contracting officer's decision stated, "structural drawings take precedence over architectural drawings in structural matters." COD, Palm House Wall Purlins. This position was apparently based upon the advice of DMJM, which stated that this was an "industry standard." R4, COF 4319. However, the contract contains no such order of precedence, and AOC has provided no witnesses or other evidence supporting AOC/DMJM's view.

Instead, as pointed out by Clark, App. PFF ¶ 634, the contract's order of precedence clause states, with regard to "overlapping or conflicting requirements in the drawings and specifications" that "[l]arge scale drawings take precedence over small scale drawings." R4, K0107-08. Here, the pertinent structural drawing is on a scale of one-eighth-inch equals one foot and the pertinent architectural drawing is on a scale of one inch equals one foot. R4, Drawing S203, Drawing A5036; App. PFF ¶ 634. Thus, under this clause, the architectural drawings showing 5-inch purlins take precedence over the structural drawings showing 6-inch purlins.

According to the Court of Appeals for the Federal Circuit:

... a matter covered by the order of precedence clause will generally be resolved in the manner prescribed by that clause. We believe that this is the proper application of the order of precedence clause. Contractors should, as a general rule, be entitled to rely on the order of precedence clause and not be required to seek clarification of a putative inconsistency between the specifications and drawings. The order of precedence clause itself resolves that inconsistency. It is, after all, the government that is the author of this contract clause, as well as the specifications and drawings.

*Hensel Phelps Constr. Co. v. United States*, 836 F.2d 1296, 1299 (Fed. Cir. 1989). According to this court, this rule generally controls in contract interpretation, absent "overreaching" by the contractor. *Id.*

Respondent nevertheless contends that this became a "patent" ambiguity during contract performance and that it was therefore "incumbent on Clark to seek clarification before fabrication." Resp. PFF, part 5, tab III, at 2. Appellant states that it did seek and obtain clarification from AOC through RFI No. 391 and obtaining RD 68-A from DMJM, which showed 5-inch wall purlins for the Palm House. App. PFF ¶¶ 635-36. While Respondent argued at the hearing that it was unreasonable for Clark to rely upon these responses in determining that 5-inch wall purlins could be provided for the Palm House walls since the responses only concerned the Garden Court/Palm House interface at the north side of the affected Palm House walls, H.Tr., 3:377-80, AOC provided no witnesses or evidence to support this argument.

Under the circumstances, we find that Standard Iron was entitled to conclude that 5-inch wall purlins would satisfy AOC's requirements. AOC argues that Standard Iron fabricated the purlins before shop drawings were submitted or approved, and that "[a]ny work done before such approval shall be at the Contractor's risk," Resp. PFF part 5, tab III, at 2, R4, K0034. However, this does not bar Standard's Iron's recovery because AOC's imposition of the requirement that 6-inch purlins be used was essentially a new requirement and the contract provision that such fabrication was at Standard's Iron's "risk" does not preclude recovery of damages for newly imposed requirements under such circumstances. See *Morrison-Knudsen Co., Inc. American Bridge Div., U.S. Steel Corp., A Joint Venture*, ASBCA No. 29670, August 25, 1986, 87-1 BCA ¶ 19,385 at 98,015; *Onetta Boat Works, Inc.*, ENG BCA No. 3733, August 7, 1981, 81-2 BCA ¶ 15,279 at 75,666.

AOC does not otherwise contend that the costs claimed by Standard Iron are unreasonable and we find Standard Iron is entitled to recover \$13,123 for this change claim.

#### **I. Revisions to Orangerie Monitor Steel Structures, Clark Change Order No. 810186**

Standard Iron claims \$14,629 for a change order issued by AOC to the Orangerie monitor steel structures. App. Exh. 13.

In addition to the large monitor structure atop the Palm House, the contract also required Clark to construct and install three smaller monitors on the Orangerie section of the Botanic Garden. Clark submitted and AOC approved shop drawings for the Orangerie monitors during February and March 1999, respectively. R4, 6525. Standard Iron then fabricated the Orangerie monitors in accordance with the original contract requirements and approved shop drawings. R4, 6525.

On April 20, 2000, AOC issued Change Order No. 90, including sketches RD-S58, RD-S59, and RD-S60, modifying the Orangerie monitor steel structures.<sup>343</sup> R4, COF 4474-77. On June 20, Clark provided AOC with a corresponding change order proposal in the amount of \$16,854. R4, COF 4466-73. On June 28, AOC informed Clark of its determination that \$10,683

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<sup>343</sup> AOC's change order altered the configuration of the ends of each monitor and required replacing three larger steel members with seven smaller pieces. See R4, 6584; Resp. Exh. 5. According to AOC's contemporaneous documentation, the change order resulted from the fact that the design had failed to coordinate the structural and architectural drawings. R4, COF 4478.

(including Clark's 10-percent markup) was the fair and reasonable cost for the change order; this determination reflected DMJM's detailed estimate that was based upon field observations of the work as it had progressed.<sup>344</sup> R4, 6528-30.

However, on July 19, AOC rescinded Change Order No. 90, stating in part that, "[a] reasonable prudent review and coordination effort of equipment product data with the shop drawings and the contract drawings would have made this remedial work unnecessary. R4, 6527. Clark disagreed with AOC's action (finding it to be "egregious and unfounded"). R4, COF 4419-20

In the contracting officer's final decision on this change claim, AOC essentially conceded Clark's entitlement to an equitable adjustment. COD, Revisions to Monitor Steel Structures.<sup>345</sup> AOC found that "latent" defects in the drawings were the cause of the remedial work to the Orangerie monitors, but it now deemed the fair and reasonable costs due Standard Iron to be \$3,185.<sup>346</sup> *Id.*; R4, COF 4421. AOC reduced its estimate of the changed work because it considered Standard Iron's proposal excessive and thought that it might include costs for remedial work for welds previously rejected by DMJM's structural engineer. COD, Revisions to Monitor Steel Structures.

Standard Iron's claim is based upon its estimated costs, prepared in advance of the work being performed. H.Tr., Torchio, 3:64. With regard to the material costs, Standard Iron based its determination upon a detailed estimate of the number, size, type, and costs of the pieces required for this change. R4, 6578. The other cost elements in Standard Iron's claim (*e.g.*, fabrication, engineering, erection) were in turn estimated based upon the number of material pieces involved. H.Tr., Torchio, 3:62-63.

AOC contends that Standard Iron has not supported its estimated cost claim, and therefore, the contractor's recovery should be denied. As indicated above, estimates of a contractor's costs may be used where actual cost data is not available. *Delco Elecs. v. United States*, 17 Cl. Ct. at 321. Cost estimates should be prepared by competent individuals with adequate knowledge of the facts and circumstances, *id.*, and be supported with detailed substantiating data. *Southwest Marine, Inc., supra*, at 137,518.

While Standard Iron has established the reasonableness of its claimed material costs (amounting to \$1,026), it has not sufficiently shown that its other estimated costs are reasonable. Unlike its material costs, Standard Iron did not provide any substantiating data for the quantities and costs involved of the costs claimed. Rather, Mr. Torchio only read the estimates that someone else

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<sup>344</sup> The primary difference between the Clark and AOC estimates involved costs for engineering. AOC believed that no costs for engineering were appropriate because the change order had provided the contractor with detailed drawings of the new requirements. R4, 6528.

<sup>345</sup> The final decision stated: "The structural drawings did not agree with the architectural drawings. The contractor fabricated the structure in accordance with the structural drawings." COD, Revisions to Monitor Steel Structures.

<sup>346</sup> The contracting officer's decision included Clark's markup for a total of \$3,505. COD, Revisions to Monitor Steel Structures.

(who did not testify) prepared. Mr. Torchio testified that he did not know the extent to which the estimated hours and costs for fabrication, engineering, and erection were in fact incurred or how they were estimated. H.Tr., Torchio, 3:61-64. Moreover, when asked if it was possible for Standard Iron to track the hours spent revising the shop drawings (*i.e.*, engineering costs) resulting from the change order, Mr. Torchio stated that it could be done. *Id.* at 3:69. Quite simply, the evidence offered here is insufficient to rely upon the estimated costs advanced by Standard Iron as a basis for resolving this change claim.

We determine, however, that AOC's June 28, 2000 estimate of \$10,683 (\$9,712 for Standard Iron when Clark's markup is removed) represents a fair estimate of the contractor's increased costs for the change order here. As set forth above, AOC contemporaneously developed and documented its own determination of the fair and reasonable costs for the additional work in the amount based on its own field observations of the work as it had progressed. R4, 6528. In contrast, AOC's later, reduced estimate supporting the contracting officer's decision is undocumented. R4, 4421. In this regard, there is no evidence that supported AOC's speculation that Standard Iron's proposal may have included costs of correcting defective welds; to the contrary, Mr. Sullivan testified that that remedial work had nothing to do with this change, H.Tr., Sullivan, 3:29, and AOC has produced no evidence that contradicts this testimony. Based on the record, we find that Standard Iron is entitled to recover \$9,712 for this change.

#### **J. Orangerie Monitor Roof Steel Revision; Clark Change Order No. 810260**

Standard Iron claims \$1,979 for an asserted constructive change in the steel for the Orangerie monitor roof steel. App. Exh. 139, attach. 8.

During the time when Clark was erecting the Orangerie monitors, the contractor and AOC on-site representatives determined that certain roof members were not sufficiently supported. H.Tr., Sullivan, 3:92-93. Clark sent RFI No. 555 to AOC, stating in relevant part:

Detail [drawing] F7/S5042 shows Orangerie roof members on top of monitor tube steel . . . . [The] maximum unsupported length of members between tube steel support on east and west sides of monitor is approx. 12' feet. Per conversation between Sullivan and DeGarmo, to reduce unsupported span of roof members, additional tube steel will be installed as shown on attached sketch.<sup>347</sup> Unless directed otherwise by Monday 9/11/00, Clark will proceed with additional tube steel.

R4, 9596. AOC responded that Clark's "use of the same size tube steel as structure for intermediate supports [was] acceptable." R4, 9593. Standard Iron and Clark subsequently fabricated and installed the additional supporting roof members on the Orangerie monitor. H.Tr., Sullivan, 3:98.

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<sup>347</sup> The sketch that Clark attached to the RFI here was one drawn by Steve DeGarmo of DMJM showing the installation of four additional supports to reduce the original span between supporting members. R4, 9597; H.Tr. Sullivan, 3:90-91, 93.

On March 9, 2001, Standard Iron submitted its request for payment in the amount of \$1,979 for the modification to the Orangerie roof tube members. R4, 9598-99. AOC denied Standard Iron's claim, contending that Clark's substitution of ridged insulation in lieu of the specified batt insulation, and "hat" channel purlins in lieu of the specified "z" purlins caused the need for the additional roof support members here. R4, COF 6104.

Here, the parties do not dispute that the Orangerie monitor required the installation of additional structural roof supports not detailed in the original design specifications. Instead, the parties' disagreement centers upon whether it was the contractor's actions, rather than the government's, that necessitated the need for the additional supporting members.

We find the record does not support AOC's assertion that the additional structural supports to the Orangerie monitor resulted from Clark's insulation and purlin substitutions. At the hearing, Mr. Sullivan testified without rebuttal that the additional supports were unrelated to Clark's use of rigid insulation and hat channel purlins, but were the result of the 10-12 foot spans between the light gauge structural members in the original design. H.Tr., Sullivan, 3:93, 106. Mr. Sullivan also explained that the top hat purlins employed here were not structural--that they were merely the means to both insulate and ventilate the roof--and that it was the structural steel underneath that required the additional supporting members. *Id.* at 3:89-91; App. Exh. 14; R4, COF 6106. While AOC attacks Mr. Sullivan's credentials, Resp. PFF, part 5, tab XV, at 1, it has not offered any evidence to rebut his testimony. Accordingly, we find that the additional supporting members was not the result of any actions for which Clark is responsible. We also find that this work was a compensable constructive change.

AOC does not dispute the amount of Standard Iron's claim, which sufficiently substantiates the estimated material costs and documents the actual labor and equipment costs. R4, 9589; H.Tr., Torchio, 3:113; Resp. PFF, part 5, tab XV, at 1-2. Accordingly, we find that Standard Iron is entitled to recover the claimed \$1,979.

#### **K. Palm House Vestibules, Clark Change Order No. 810163**

The design of the vestibules in the contract drawings was changed twice by AOC during the performance of the contract. Standard Iron claims \$9,699 for the additional work of detailing the vestibules. This change also relates to Clark's claimed delay during Periods 2 and 3, discussed above.

The design drawings provided for two vestibules with a hip-roof design at the east and west corners at the south end of the Palm House to provide access to the outdoor Garden from the Palm House. The original vestibule drawings provided insufficient dimensions, such as elevations, spacing of beams, or the "actual ridge of the support frame," such that the shop drawings for the vestibules could not be produced. H.Tr., Miranda, 17:117-18, 128.

On January 20, 2000, AOC issued revised drawings RD-51 and RD-52 for vestibule framing to Clark. See C4 Supp. 22 0346. These drawings showed the vestibule being bisected by a hip beam that created two different roof slopes (45 degrees/30 degrees) on either side of the beam, which Rough Brothers stated would "not allow the glazing system framing to work." *See*

C4 Supp. 22 1152; *see also* H.Tr., Witt, 19:155-56; D.Tr., Witt, 53. On April 5, 2000, DMJM agreed to change the roof slope to 30 degrees on each side. R4, COF 5044. Pursuant to its subcontract with Standard Iron, A&N detailed revised shop drawings in response to the two DMJM revisions. R4, 5046.

AOC does not dispute, and we find, that the original design of the vestibules in the contract drawings was defective, and that its issuance of revised drawings on January 20, 2000 was necessary to correct this design deficiency. However, AOC asserts that the January 2000 revision was not defective, and that, although DMJM agreed to alter the roof slope in April 2000, this was only done to make it easier for Rough Brothers to attach its glazing system to the vestibule. Resp. PFF, part 2, tab X, at 1, 3. However, Mr. Witt of Rough Brothers testified that, although it would be possible to attach a glazing system to the roof of the vestibules with the differing slope angles on each side of the hip-beam, it would be impossible to seal it because the aluminum extrusions on the roof would not fit together. *See* H.Tr., Witt, 19:158-159; *see also* D.Tr., Witt, 53; H.Tr., Sullivan, 4:22. Apart from referencing DMJM's unsupported "opinion" that the change was made to accommodate Rough Brothers' installation of the glazing system, *see* R4, COF 5039, AOC has not provided probative evidence or testimony rebutting Mr. Witt's testimony that the redesigned vestibule was unworkable.<sup>348</sup> In sum, the record shows that Standard Iron/A&N incurred costs in twice revising shop drawings because of DMJM's defective designs.

However, as noted, in addition to proving its entitlement to an equitable adjustment it is also the claimant's burden to prove the amount it seeks. *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199. Standard Iron's claim consists of two parts: (1) \$4,109 for preparing shop drawings of the vestibules that ultimately were submitted to Standard Iron on January 27, 2000, after receiving the final details from DMJM's first revised drawings of the vestibules, and (2) \$5,590 for revising its shop drawings after the roof-slope revisions. *See* R4, COF 5046. These claims are not based on actual costs but on two estimates provided by A&N, which reflected the additional number of hours (and costs) that A&N expected to incur to perform the revisions to the vestibule drawings that it had previously completed, plus Standard Iron's markups. *See* R4, 4975-76, 4988-89, 5046-51.

We again note that estimates of a contractor's costs may be used where actual cost data is not available. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321. Such estimates should be prepared by competent individuals with adequate knowledge of the facts and circumstances, and supported with detailed substantiating data. *Id.*

Here, neither Clark nor Standard Iron nor A&N presented evidence that actual cost data was unavailable. Inasmuch as A&N's estimates, upon which Standard Iron bases its change claim here, represented the additional hours necessary to revise shop drawings that the company had previously completed, we know of no reason why the actual number of hours incurred for this

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<sup>348</sup> Mr. Brainerd of DMJM testified that the roof slope change to the revised drawings was done to make it easier for Rough Brothers. *See* H.Tr., Brainerd, 28:209-10. In response to cross-examination, however, Mr. Brainerd could not explain why the revised design, with differing roof slopes, was workable and admitted that "I don't know the detail of how Rough would actually have done it." *Id.*

effort could not be tracked, given that Standard Iron/A&N were presumably aware that they considered this to be changed work. While A&N's representative Mr. Miranda testified at the hearing, he provided no testimony whether actual cost data was available or why A&N's actual costs could not be tracked.<sup>349</sup> Standard Iron also provided no detailed substantiating data for the estimates or evidence that they were prepared by competent individuals with adequate knowledge. Again, although A&N's representative was presumably able to testify on this matter, he did not do so and Appellant introduced no evidence as to how A&N determined the estimates upon which several of Standard Iron's change claims are based.<sup>350</sup> In sum, we find Appellant has not carried its burden of establishing that A&N's estimates constituted a fair approximation of damages for this change. In the absence of any other evidence indicating the amount of Standard Iron's damages, we deny its change claim.

#### **L. Palm House Maintenance Level Catwalk, Clark Change Order No. 810117.**

Standard Iron claims \$8,289 for a change order revising the drawings for the maintenance level catwalks.<sup>351</sup> H.Tr., Torchio, 3:151. The background for this change order issued by AOC to accommodate Rough Brothers' glazing system, is discussed in depth above in Period 3 where Clark asserted, but we did not find, that this issue delayed contract performance.

On June 14, 2000, Clark submitted a cost proposal in the amount of \$14,606 for the changes in catwalk levels 3 and 4. R4, 4946-47. Clark's proposal was based upon the cost estimates of Standard Iron in the amount of \$11,858 and of Rough in the amount of \$1,420, plus Clark's \$1,328 (10-percent) markup. R4, 4941-47. In response to Clark's cost proposal, the AOC acknowledged that its drawing revisions may have necessitated additional work by Clark, but stated, "the drawings noted in your proposal do not match the drawings previously submitted for the catwalks." R4, 4924. AOC then requested information regarding the actual drawings that had required revision due to the subject changes. *Id.*

On February 28, 2001, Clark submitted Standard Iron's "backup" for the cost of revising the drawings as a result of the changes to AOC. R4, 4892. Standard Iron's backup documentation consisted of a review performed by Standard Iron's project manager, Jerry Frederick, which identified the specific drawings requiring revision and the estimated engineering hours for each drawing. R4, 4895-97. As part of his review, Mr. Frederick also reduced the number of engineering hours that A&N had originally estimated for revising the drawings affected by

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<sup>349</sup> While Clark argues that A&N could not allocate its estimated costs by change order, and that the best evidence of the costs for these additional revised drawings were the estimates, App. Reply Brief at 93, it provides no evidence supporting these assertions.

<sup>350</sup> Mr. Torchio testified that in his opinion the A&N costs were fair and reasonable, but offered no evidence about how the estimates were prepared. H.Tr., Torchio, 15:310-11. Such a conclusory opinion without a discussion as to the basis for the opinion does not satisfy Appellant's burden of showing its estimated costs represent a reasonable value of the change claim.

<sup>351</sup> We note that while Clark's revised claim states that the amount sought here by Standard Iron is \$14,606, App. Exh. 139, attach. 8, Standard Iron's representative testified that the amount of its claim for this change order was \$8,289. H.Tr., Torchio, 3:151.

AOC's change order. *Id.* Standard Iron's portion of Clark's revised claim totaled \$8,639.<sup>352</sup> R4, 4893-97.

On May 30, 2001, AOC issued a determination that the fair and reasonable costs for the additional work performed here were \$3,240. R4, 4891. Specifically, AOC determined that the fair and reasonable amount payable to Standard Iron was \$1,525, the fair and reasonable amount payable to Rough was \$1,420, and the associated Clark markup was \$295; AOC modified the contract to reflect this equitable adjustment.<sup>353</sup> R4, 4898. At the hearing, Standard Iron again amended its claim and stated that the amount now being sought for this change order was \$8,289.<sup>354</sup> H.Tr., Torchio, 3:151.

We have reviewed Mr. Frederick's detailed, documented analysis of A&N's claimed detailing costs,<sup>355</sup> which is not challenged by AOC,<sup>356</sup> and find that it reasonably substantiates the amount claimed here by Standard Iron. We thus find that Standard Iron is entitled to recover \$6,764 for this change claim.<sup>357</sup>

#### **M. Monitor Bolt-Holes, Clark Change Order No. 810213**

Standard Iron claims \$4,304 for changing the size of the bolts in the monitor from three-quarters-inch to seven-eighths-inch pursuant to the direction of AOC after the monitor had already been assembled. H.Tr., Torchio, 3:255; App. Exh. 139, attach. 8. As noted above, the record shows that this change delayed contract performance during Period 3.

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<sup>352</sup> While Standard Iron's revised cost proposal bears the same March 23, 2000 date as its original cost proposal, see R4, COF 4894, 4941, it was apparently prepared and provided to Clark on or about February 5, 2001. R4, 4894.

<sup>353</sup> While Mr. Sullivan testified that Clark had not been paid for this change order, H.Tr., Sullivan, 3:136, the record shows that the contract was modified to reflect AOC's \$3,240 equitable adjustment. R4, 4891.

<sup>354</sup> Mr. Torchio acknowledged that he could not substantiate \$350 in the claim and amended the claim to remove this amount. H.Tr., Torchio, 3:150-51.

<sup>355</sup> We contrast Mr. Frederick's detailed review of, and adjustments to, A&N's estimate to assure its reasonableness with Standard Iron's apparent failure to review or explain other A&N estimates, such as in Clark Change Order No. 810163, which we above deny as unsubstantiated.

<sup>356</sup> While not challenging the reasonableness of the claimed costs, AOC, in its post-hearing brief, apparently disputes Standard Iron's entitlement to an equitable adjustment for this change, in arguing that Standard Iron and/or A&N should have anticipated performing additional work. Resp. PFF, part 5, tab V, at 3. This spurious argument fails to account for the fact that AOC issued a change order and has admitted liability for the consequences of the change by unilaterally determining the value of the change. Similarly, while AOC challenges the sufficiency of the evidence regarding Rough Brothers' additional work here, Resp. PFF part 5, tab V, at 3, AOC already compensated Rough Brothers' claimed costs for this change. R4, 4898.

<sup>357</sup> \$8,289 claimed minus \$1,525 previously allowed equals \$6,764.

On or about June 8, 1999, Clark submitted to the AOC for approval a set of Standard Iron shop drawings that detailed various elements of the Palm House, including the Palm House monitor trusses. H.Tr., Sullivan, 3:222; R4, SI 00004-09. AOC's review of submittals was to determine whether the contractor's shop drawings complied with the contract requirements.<sup>358</sup> R4, K0034. The shop drawings submitted here indicated, among other things, the number, size, types, and locations of the bolts that Standard Iron planned to use to construct the Palm House monitor. R4, SI 00004-09.

On July 9, 1999, AOC through DMJM completed its review of the Standard Iron shop drawings and returned the submittals to Clark. H.Tr., Sullivan, 3:222. Although DMJM's review contained various comments on the shop drawings themselves, DMJM took no exception to the size, location, or number of bolts reflected in the Standard Iron shop drawings. DMJM also stamped each Standard Iron shop drawing here as "Reviewed, Exceptions Noted, Resubmission Required." R4, SI0004-09. The AOC submittal transmittal, to which the reviewed Standard Iron shop drawings were attached, also informed the contractor that it was required to revise and resubmit the shop drawings, and stated, among other things, that the "[r]esubmittal should include entire structure and roof truss plan to allow for complete review."<sup>359</sup> R4, SI0001.

As detailed above, in October 1999, Clark instructed Standard Iron to begin fabrication of the Palm House monitor in advance of approved shop drawings. Clark directed this action because the renovation project was behind schedule and the contractor was under pressure to show progress on the Palm House. H.Tr., Sullivan, 3:228-29. Clark also believed that Standard Iron's use of revised but unapproved shop drawings was a reasonable action because AOC's initial review of the drawings had determined no major deficiencies. *Id.* By February 17, 2000, Standard Iron completed fabrication and mockup assembly of the Palm House monitor. A4 Supp. R00715. Standard Iron then disassembled the monitor and shipped it to the Botanic Garden job site in time for reassembly and erection by April 18, 2000. H.Tr., Torchio, 15:272.

On that same date (April 18, 2000), Clark resubmitted to AOC the Standard Iron shop drawings of the Palm House monitor for approval, having revised those items to which AOC took exception in its first review.<sup>360</sup> R4, SI00057. DMJM completed its review of the revised Standard Iron shop drawings for the Palm House monitor on May 2. While DMJM again took no exception to the bolt size (three-quarters-inch) and bolt locations as reflected in the shop drawings, it objected to the number of bolts proposed by Standard Iron in various locations of the

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<sup>358</sup> The contract also stated that "[a]pproval [of shop drawings] by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such submittals, nor from responsibility for complying with the requirements of this contract . . . ." R4, K0034.

<sup>359</sup> As used here, the Andy Savaugé, the DMJM project engineer, considered the term "roof truss plan" to be synonymous with "erection plan." H.Tr., Savaugé, 3:290-91.

<sup>360</sup> It is unclear why Clark did not resubmit the Palm House monitor truss shop drawings until April 18, 2000. While Appellant's witnesses testified that this delay was because of AOC's requirement that the drawings be submitted as one complete package and be certified by Rough Brothers, *see* H.Tr., Sullivan, 3:228; Torchio, 3:254, Mr. Torchio acknowledged that there had been another separate shop drawing submission by the subcontractor in September 1999. H.Tr., Torchio, 3:252-53; *see* App. Exh. 19.

monitor trusses. Specifically, DMJM found that Standard Iron in a number of instances had failed to provide the number of bolts required by the contract drawings. R4, SI00120-25.

Clark submitted RFI No. 457 on May 5, asking why the additional bolts were required, as the connections shown in its shop drawings were, in Clark's view, adequate.<sup>361</sup> C4 Supp. 03 01438-43. AOC responded on May 12, asserting that the additional bolts were not only physically necessary, but also required by the contract documents, and that Standard Iron had provided less than what was required. C4 Supp. 03 01435. Absent the submission of structural calculations by Standard Iron showing that its proposed connections were in fact adequate, AOC then provided the contractor with the choice of either increasing the size of the existing bolts from three-quarters-inch to seven-eighths-inch or adding the additional bolts. R4, 8416. Standard Iron, with AOC's approval, subsequently decided to replace 102 three-quarters-inch-bolts with seven-eighths-inch-bolts by reaming out the existing holes and using larger bolts, and to add 8 additional three-quarters-inch-bolts. H.Tr., Sullivan, 3:235; R4, 8404. Standard Iron performed this work at the job site on May 17 and 18, R4, 8408, and erected the monitor atop the Palm House on May 23. C4 Supp. 01 01234.

Standard Iron claims an equitable adjustment in the amount of \$4,304 for the costs it incurred in connection with all 110 bolt revisions. H.Tr., Torchio, 3:255. Although AOC disputes Standard Iron's entitlement, AOC does not challenge the reasonableness of Standard Iron's claimed costs.

The government is generally entitled to insist upon strict compliance with unambiguous design specifications, and to require correction of nonconforming work. *Cascade Pacific Int'l v. United States*, 773 F.2d 287, 291 (Fed. Cir. 1985); *C.H. Hyperbarics, Inc., supra*, at 161,144. If the government furnishes the contractor with an unambiguous design specification, then the government is not obligated to accept non-conforming work, even if the work is equivalent or superior to that which is specified. *C&D Constr., Inc.*, ASBCA Nos. 48590, 49033, October 7, 1997, 97-2 BCA ¶ 29,283 at 145,696. Conversely, when the government's interpretation of the contract requirements is in error and it demands the contractor undertake work that the contract did not require, then the contractor is entitled to an equitable adjustment for the additional work performed. *A&D Fire Protection, Inc.*, ASBCA Nos. 53103, 53838, October 28, 2002, 02-2 BCA ¶ 32,053 at 158,448.

As a preliminary matter, we find that the contract's structural drawings constituted design requirements, in that they set forth precise measurements, tolerances and materials with which the contractor was required to comply. We also find that the relevant contract drawings adequately established the number of bolts required for the connections at issue,<sup>362</sup> but that in

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<sup>361</sup> Standard Iron's RFI also asserted that there was insufficient clearance for the additional bolts demanded by AOC, given the American Institute of Steel Constructors (AISC) bolt hole spacing requirements. C4 Supp. 03 1440; H.Tr, Sullivan, 3:234.

<sup>362</sup> At the hearing, Mr. Torchio testified that the contract drawings lacked sufficient information with regard to the bolt connections in certain locations, H.Tr., Torchio, 3:253, 263-64, and therefore, the company properly determined the number of bolts required in accordance with AISC standard practice. *Id.* at 3:253, 265. We disagree for several reasons. Standard Iron failed to establish that the bolt connections to which AOC took exception were ones that lacked sufficient detail in the contract drawings.

certain instances the bolt-holes ultimately demanded by AOC exceeded the stated contract requirements. *Compare* R4, Drawings S401-S405 with R4, SI000120-24.

During contract performance, Clark performed a detailed engineering review of the contract drawings and the Standard Iron shop drawings with regard to the bolt-hole issue. H.Tr., Sullivan, 3:238, 242-43. The Clark engineering review determined that Standard Iron had detailed 50 of the bolt connections in accordance with the contract drawings, but that the remaining bolt connections to which AOC took exception, and which Standard Iron revised in the field, were required by the contract drawings and were not a change. R4, 8436-37, 8439.

Based on our review, we find no basis to challenge this analysis. While Andy Savaugé, DMJM's engineer, testified that all the bolt connections to which AOC took exception were required by the contract, *see* H.Tr., Savaugé, 3:279-87, we find, based on our review, this testimony to be unpersuasive and unsupported by the record. *See id.* at 3:296-98. Thus, we find that 50 of the bolt connections, to which AOC took exception, exceeded the contract requirements and constituted a compensable change, but that the remaining 60 bolt connections, to which the AOC also took exception, were required by the contract drawings.

Appellant nevertheless argues that all the bolt revisions constituted a compensable change because there was no reason why the AOC should not have identified its bolt-hole "changes" in the June 1999 shop drawing submittal. *See* H.Tr. at 3:217-19. Appellant's assertion that because the AOC failed to identify the deficiencies in Standard Iron's shop drawings until April 2000, when it could have determined the subcontractor's noncompliance with the contract requirements in July 1999, does not, however, provide a basis to find AOC liable for the resulting corrections. AOC did not explicitly or implicitly approve or accept Standard Iron's initial shop drawings here with regard to the bolt connections. Instead, AOC informed Clark that the drawings had been reviewed, exceptions noted, and that resubmission together with the contractor's erection plan was required for approval.<sup>363</sup>

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Mr. Torchio also provided no specific citation or reference in support of the allegation that the company had determined the bolt connections in accordance with AISC standard practice. *Id.* at 3:261. Standard Iron also failed to explain how steel construction standards were applicable here to the fabrication of structural aluminum. Finally, it is the contractor's responsibility, when faced with defective specifications, including apparent conflicts between contract requirements and applicable code standards, to provide the government with timely notice of the defect. *McElroy Mach. & Mfg. Co., Inc.*, ASBCA No. 46477, December 23, 1998, 99-1 BCA ¶ 30,185 at 149,356; *JGB Enters., Inc.*, *supra*, at 142,313.

<sup>363</sup> The parties provided considerable argument concerning the impact of the Standard Iron erection plan on this issue. Specifically, the Mr. Savaugé asserted that AOC could not have determined if the number of bolts originally proposed by Standard Iron in its June 1999 shop drawings was sufficient because the initial submittal lacked an erection plan, which he described as the "key piece to the puzzle." H.Tr., Savaugé, 3:276. In turn, Clark established that Standard Iron had provided the missing erection plan with a different drawing submittal in July 1999, but that DMJM had not availed itself of it and reexamined Standard Iron's earlier shop drawing submittal. H.Tr., Sullivan, 3:312-23. We think the issue concerning Standard's Iron's initial failure to provide an erection plan with its shop drawings is a "red herring." As reflected by the contemporaneous documentation, AOC took exception to the number of bolts proposed by Standard Iron because the contractor had allegedly failed to comply with the requirements of the

As indicated, the government is entitled to enforce strict compliance with its plans and specifications. *Cascade Pacific Int'l v. United States*, 773 F.2d at 291. Further, as stated by the Armed Services Board of Contract Appeals:

We do not agree that the lack of protest and/or comment by Government inspectors or by other representatives of the Government can under normal circumstances be construed as an interpretation of the meaning of a contract. The Government has not obligated itself to supervise the work or to make a step by step inspection to avoid the installation of improper or unacceptable work. On the contrary, the contract places upon the contractor the burden of compliance with the contract specifications.

*The Ryan Co.*, ASBCA No. 53385, November 6, 2002, 03-1 BCA ¶ 32,077 at 158,323, quoting *Robert McMullan & Son, Inc.*, ASBCA No. 11408, March 20, 1968, 68-1 BCA ¶ 6940 at 32,093; see *Atterton Painting & Constr., Inc.*, ASBCA No. 31471, December 15, 1987, 88-1 BCA ¶ 20,478 at 103,585 (a contractor cannot permissibly transfer its own shortcoming to the government because the inspector saw the contractor's work as it was done and did not object to it); *Globe Eng'g Co.*, ASBCA No. 23934, February 12, 1983, 83-1 BCA ¶ 16,370 at 81,343 (a contractor cannot shift the blame for its own incompetence or negligence to the inspector because the latter did not immediately catch the improper action and call it to the contractor's attention).

Here, to the extent AOC's review of the initial Standard Iron shop drawings missed identifying the bolt connection defect, we can only surmise that it was unwitting and without knowledge of the deviation. There is no evidence to the contrary. Even assuming that the government reviewers did not speak out when they first became aware of the situation, the failure to do so does not legally excuse the contractor's failure to comply with the contract terms. *Robert McMullan & Son, Inc.*, ASBCA No. 21455, March 15, 1977, 77-1 BCA ¶ 12,456 at 60,373.

Here, we find that the contractor submitted sufficient evidence to establish that the \$4,304 claimed is both allowable and reasonable. We also find that Standard Iron is entitled to an equitable adjustment for the 50 of the 110 revised bolt connections it made that were not required by the contract. As the claim here did not segregate the costs by individual bolt connections, we determine that Standard Iron is entitled to recover a proportionate amount of the claimed damages, which we calculate to be \$1,956 ( $\$4,304 \times 50/110 = \$1,956$ ).

#### **N. Palm House Lean-To Dimension Change, Clark Change Order No. 810165**

Standard Iron claims \$3,896 for AOC's changing of the dimensions of trusses "CC" and "CC extended" at the Palm House lean-to. After hearing the testimony on the matter, AOC conceded liability. H.Tr., 4:199-21. This conceded claim was apparently not included among those change claims settled or conceded by the parties that are no longer part of this appeal. See

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contract drawings--an issue that was not affected by the submission or nonsubmission of the erection drawings. R4, SI00121-25; C4 Supp. 03:01435-37.

App. Exh. 139, attach. 8. Consequently, we find that Standard Iron is entitled to recover \$3,896 for this change claim.

**O. Change to Steel Supports at Sliding Doors in Palm House; Clark Change Order No. 810408**

Clark and Standard Iron claim \$950 and \$2,878, respectively, for a change to the steel supports to the automatic entrance doors in the east and west vestibules in the Palm House. R4, 12040.

The vestibules function as small transitional structures between the Palm House and the adjacent gardens. H.Tr., Sullivan, 4:13. The contract drawings required Clark to install automatic entrance doors that opened from the east and west vestibules into the gardens. *See* R4, Drawing A108. The automatic doors were to be installed in pairs that retracted in a “store front” manner. *See* R4, Drawing A002 (S.10, S.13). The contract drawings also specified the requirements and location of the steel roof rafter that Clark was to install for each vestibule. R4, Drawings S203; A5034, details L16 and R16. During construction of the vestibules, Clark discovered that the placement of the roof rafter, as specified, ended in the channel of the entrance door assemblies. H.Tr., Sullivan, 4:12-16.

Clark used Mr. Mansfield to reengineer a solution to the conflict between the roof rafter and entrance door assembly. H.Tr., Sullivan, 4:12-14. Specifically, Mr. Mansfield proposed welding plates to the sides of each rafter, so that the lower portion of the rafter could be cut out and removed, thereby eliminating that portion of the rafter that interfered with the entrance door assembly. *Id.* at 4:15, 37-40; R4, 12041-42. Clark subsequently had Standard Iron reconfigure the steel rafter so as to permit the required door assembly to fully function.<sup>364</sup> On September 20, 2001, Clark submitted its proposal for itself and Standard Iron for \$950 and \$2,878, respectively, plus Clark’s 10-percent markup, for the additional work performed here. R4, 12040.

AOC first argues that the defect to its contract drawings was a patent ambiguity that Clark was required to bring to the owner’s attention prior to award, and that its failure to do so should preclude its recovery of its costs resulting from this design error. Resp. PFF, part 5, tab XIV, at 3.

The government is generally responsible for the design and related omissions, errors, and deficiencies in the design specifications and drawing it prepares and requires the contractor to use. *White v. Edsall Constr. Co., Inc.*, 296 F.3d 1081, 1087 (2002). An exception to this general rule exists when the defect is patent and the contractor fails to seek clarification before submitting its bid or proposal. A defect is patent if it would have been apparent to a reasonable person in the claimant’s position. *Id.* By contrast, a defect is latent in nature when is in not obvious or apparent in the context of a reasonable, but busy, bidder. *Foothill Eng’g.*, IBCA No. 3119-A, February 12, 1993, 94-2 BCA ¶ 26,732 at 133,030-32.

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<sup>364</sup> While the door vendor, Carolina Door, also shortened the width of the entrance door assemblies, R4, 12034; H.Tr., Sullivan, 4:30, 55, such efforts did not negate the conflict with the roof rafter, R4, 12034, and are not part of the claim here. H.Tr., Sullivan, 4:31.

In his testimony, Mr. Sullivan stated that the conflict between the drawings existed from the day that the drawings were put out to bid. H.Tr., Sullivan, 4:12. From this statement alone, AOC draws the conclusion that the defect was readily apparent to all reasonable offerors. This inference is in error. The solicitation provided prospective offerors with an extensive set of design drawings and specifications. The defect here--a steel roof rafter and door assembly occupying the same space--was not apparent from or part of any one drawing, but was the byproduct of various structural and architectural drawing requirements. While AOC suggests that the defect could have been found if structural, architectural and/or shop drawings had all been superimposed upon each other by the contractor for the entire structure as part of its proposal preparation process, *id.* at 4:59-61, the necessity for such efforts to discover the conflict only substantiates our determination that the defect here was latent in nature.

AOC also argues that the contractor's additional costs here resulted from Clark's failure to properly coordinate the work of its structural and non-structural trades. In this regard, AOC notes that Clark's glass door subcontractor had submitted shop drawings for the doors here, and there was no indication that there were any problems coordinating the doors with the structural steel installation. AOC further notes that shop drawings for the steel structure were also submitted by Clark to the AOC, and there was no indication that there were any problems coordinating the steel members with the glass door installation. AOC contends that Clark's coordination efforts should have realized that a custom-fabricated sliding glass door assembly was necessary for each vestibule in light of the placement of the competing steel roof rafter. Resp. PFF, part 5, tab XIV.

We agree with AOC that the contract imposed a duty upon the contractor to coordinate the efforts of its subcontractors. Clark's duty to coordinate trades and components, however, is not a panacea for all of the defects within the contract's design specifications. Here, the contract drawings specified the exact requirements and location of each vestibule's steel roof rafter. R4, Drawings. S203; A5034, details L16 and R16. The contract's specifications and drawings also specified the requirements for the automatic entrance doors that were to be used in each vestibule, including the required 6-foot door opening. R4, K0660; Drawings A108, A002 (S.10, S.13). While the door vendor was able to provide a shortened, custom-fabricated entrance door assembly, H.Tr., Sullivan, 4:30, 55, even that effort did not eliminate the conflict between the contract's entrance door and structural requirements for the vestibules. *Id.* at 4:30-31. Notwithstanding AOC's allegations to the contrary, we find that it was not Clark's choice of components that resulted in the spatial conflict here, and that the contractor's duty to coordinate neither caused, nor would have eliminated, the problem without having to change the configuration of the door area, which constitutes a constructive change to the contract. See *Hol-Gar Mfg. Corp., v. United States*, 175 Ct. Cl. at 523.

AOC does not challenge the amounts claimed for this change claim, which based upon our review are supported and reasonable. We therefore find that Standard Iron is entitled to recover \$2,878 and Clark is entitled to recover \$950 for this change claim.

**P. Garden Court South Wall Finned Tube Radiation Support, Clark Change Order No. 810401**

Standard Iron claims \$8,402 (including a 10-percent markup) for the fabrication and installation of finned tube radiation supports on the south wall of the Garden Court. R4, 11954. Standard Iron's subcontractor, Williams Steel, performed this work. R4, 11976. The issue presented in this claim is the same as that in two other change claims that we decide below: (1) the Corner House finned tube radiation supports that were installed by Rough Brothers and (2) the Palm House finned tube radiation system supports that were installed by Goodwin (a Clark vendor). We discuss all three change requests here.

On this project, Kirlin installed the specified finned tube radiation, which is an enclosed unit cabinet with stainless steel brackets provided as support; the finned tube radiation in this case was manufactured by Vulcan Radiator Corporation. App. Exh. 18; R4, 10481, 10797; H.Tr., Sullivan, 3:180; 8:206, 222; 10:14, 16. Each of Kirlin's submittals for these items was approved by AOC. H.Tr., Sullivan, 8:209; 10:14. The finned tube radiation systems provide environmental conditioning and assist in snow and ice melt. See H.Tr., Taylor, 9:276.

While the contract "generally" shows where the finned tube radiation systems were to be installed in the Botanic Garden facility, there was no place on the building structure in the areas of the facility involving these three changes for the finned tube radiation systems to be attached if only the stainless steel support brackets on the Vulcan systems were used; in each case, Clark designed and constructed a solution to allow the support brackets for the finned tube radiation to attach to something connected to the building structure. H.Tr., Sullivan, 3:182-83, 197-201; 8:209, 213, 228; 10:17-21, 51-52. Specifically, for the Garden Court and for the lower level of finned tube radiation systems in the Palm House, Williams Steel and Goodwin, respectively, installed "back to back steel angles that would create a surface to mount these finned tube cabinets." *Id.* at 3:183; 10:20-21, 33. For the Corner Houses, a galvanized steel "C-channel," designed to mount the finned tube radiation system to the structure, was installed by Rough Brothers. *Id.* at 8:214-18, 225; App. Exh. 37. For the upper level of finned tube radiation systems in the Palm House, 2-foot long galvanized steel plates were welded by Goodwin to the existing horizontal truss to provide support for the finned tube radiation system. H.Tr., Sullivan, 10:19, 30-31, 38; R4, COF 3388. Mr. Sullivan stated that the issue of how to attach the finned tube radiation systems also came up in other areas of the facility as well, for example, the north wall of the Garden Court, but Clark chose not to pursue claims for resolving the problems in those areas. H.Tr., Sullivan, 10:22, 48.

The contract states that the finned tube radiation is a "terminal unit. R4, K1193. Section 15830 of the contract, as amended, addresses terminal units generally and finned tube radiation specifically. Under Part 2 of this section, entitled "Products," is paragraph 2.1, entitled "Finned Tube Radiation," which states:

- A. General: Provide finned tube radiation of lengths, configurations and in locations indicated, and of capacities, style, and having accessories as scheduled.

- B. Cabinets: Minimum 18-ga. cold-rolled stainless steel full back plate, minimum 16-ga. front. Brace and reinforce front minimum of 4'-0" o.c. without visible fasteners. Finned tube radiation in glass houses shall be provided with 14 gauge perforated stainless steel cover.
- C. Elements: Copper tube and fins, or steel tube and steel fins as indicated with tube mechanically expanded into finned collars to eliminate noise and insure durability and performance at scheduled ratings. All elements in glass houses shall be provided with factory applied phenolic coatings.
- D. Supports: Supports shall be provided for all configurations of the finned tube radiation shown. Supports shall be of stainless steel construction and shall be coordinated with the building structure and finned tube arrangement for each installation.
- E. Finish: Aluminum color heat resisting paint for back plate, factory finished baked enamel, standard colors, on front and accessories, as approved by architect.
- F. Accessories.
  1. End panels, inside and outside corners, and enclosure extension.
  2. Access panels in front of valves, balancing cocks, and traps.
  3. Factory-mounted dampers
  4. Sill extensions.
  5. Mullion channels.
  6. Pilaster covers.

R4, K1195. Paragraph 1.4 of section 15830, entitled "Submittals," contains the following requirements:

- A. Product Data: Submit manufacturer's specifications for terminal units showing dimensions, capacities, ratings, performance characteristics, gages and finishes of materials, and installation instructions.
- B. Shop Drawings: Submit assembly-type shop drawings showing unit dimensions, construction details, support and field connection details.

R4, K1194. The contract drawings show the "general" location of where the finned tube radiation systems are to be installed, but not "how they were supposed to be attached." H.Tr., Sullivan, 3:197, 8:227, 10:51-52.

Clark asserts that AOC's locating the finned tube radiation systems where it did, but not providing a means to attach the finned tube radiation systems to the building structure, was a design error. Clark contends that AOC should therefore be liable for Clark's costs of providing a means by which the supports for the finned tube radiation system would be attached to the building. We disagree.

That Clark was responsible under the contract for installing the finned tube radiation systems at the locations designated on the drawings is beyond dispute. Section 2.1.A of section 15830 requires that the finned tube radiation be provided "in locations indicated" on the contract drawings. R4, K1195; H.Tr., Sullivan, 8:207. Also, Clark was responsible pursuant to paragraph 1.4 of section 15830 for providing shop drawings showing "construction details, support and field connection details." In addition, paragraph 2.1.D of section 15830 requires the stainless steel supports on the finned tube radiation system "be coordinated with the building structure and finned tube arrangement for each installation." R4, K1194-95. Thus, the issue is whether AOC's failure to provide a means to attach the finned tube radiation system to the building structure constituted a compensable design defect or whether providing this means was Clark's responsibility under the contract.

Paragraph 2.1 of the section 15830 of the contract, which contains the provisions relating to finned tube radiation, includes both design and performance design provisions. As discussed above, to determine whether a specification, or portion thereof, is a design specification or a performance specification, we will primarily look to the obligations imposed and discretion allowed by the specification. Specifically, specifications, or portions thereof, that provide detailed requirements directing the contractor as to how the work is to be accomplished "as one would a road map" and do not provide discretion to the contractor are regarded as design specifications, whereas specifications, or portions thereof, that provide the contractor discretion as to how to accomplish the work are at least to that extent regarded as performance specifications. *Blake Constr. Co.*, 987 F.2d at 746; *Apollo Sheet Metal, Inc. v. United States*, 44 Fed. Cl. at 212-13; *Fru-Con Constr. Corp. v. United States*, 42 Fed. Cl. at 96; *Big Chief Drilling Co. v. United States*, 26 Cl.Ct. 1276, 1294 (1992).

Paragraph 2.1 of section 15830 contains many requirements that must be followed by the contractor as a "road map" and are thus design specifications, for example, the minimum requirements for the cabinets for finned tube radiation cabinets stated in paragraph 2.1.B. However, except for the design specification requirement that stainless steel supports for the finned tube radiation be provided, the method by which these finned tube radiation systems were to be attached to the building structure at the locations designated in the contract drawings was left to the contractor's discretion. Indeed, neither the drawings nor the specifications specified how the supports for the finned tube radiation systems were to be attached to the building structure. H.Tr., Sullivan, 8:227; 10:52. We find that the method of installing the finned tube radiation system, including attaching it to the building structure, was a performance specification.

Clark's argues that it was not contractually responsible for this work because the specification did not expressly state that it was responsible for "creating the building structure" by fabricating elements that would permit the finned tube radiation system to be attached to the building structure. App. PFF ¶ 219. However, this argument does not account for the fact that the requirement that Clark install the finned tube radiation systems was a performance specification that envisioned that the contractor would use its ingenuity and discretion to determine what means and methods it would use to coordinate or attach the finned tube radiation systems to the building structure at the locations designated on the drawings. Because the installation of the

finned tube radiation systems was a performance specification requirement, this means that Clark is responsible for any additional hardware and labor necessary to accomplish this work. See *Service Eng'g Co.*, ASBCA No. 40273, May 29, 1992, 92-3 BCA ¶ 25,122 at 125,240-41. While Clark also argues that it satisfied its contract requirements when it provided the specified stainless steel supports for the finned tube radiation, App. Reply Brief at 116, this argument fails to consider the fact that Clark was responsible for installing the finned tube radiation in accordance with the performance specification requirements.

Thus, we find that Clark was responsible for providing the means for attaching the finned tube radiation systems to the building structure and that this is therefore not a compensable change to the contract. See *Service Eng'g Co.*, *supra*, at 125,240-41; *Professional Printing of Kansas, Inc.*, GPOBCA No. 28-93, Sept. 16, 1997, 1997 GPOBCA LEXIS 5. In this regard, we note that there is no requirement for the Government to show every detail in the drawings where they give the contractor sufficiently clear notice of the contract requirements and obligations. See *Northwest Marine, Inc.*, ASBCA No. 43502, November 22, 1993, 94-1 BCA ¶ 26,521 at 131,999; *J.W. Bateson Co., Inc.*, *supra*, at 31,560. Therefore, we deny Standard Iron's change claim for the fabrication and installation of the finned tube radiation system supports on the south wall of the Garden Court.<sup>365</sup>

## **XV. ROUGH BROTHERS' CLAIMS**

As noted above, Rough Brothers was the subcontractor responsible for the glazing system for the conservatory. Rough Brothers claims \$133,010 for government-caused delay, \$225,938 for government-caused acceleration and \$35,000 in claim preparation costs.<sup>366</sup> C4 Supp. 08 00493-96. Clark has also submitted a number of change claims on Rough Brothers' behalf.

### **A. Delay Claims**

Rough Brothers' \$133,010 delay claim has two distinct parts: (1) delays in the design and engineering of its glazing system, which caused delay in the fabrication of the glazing system and (2) delays in the installation of the Palm House glazing system.

#### **1. Design and Engineering Delay**

Appellant states that Rough Brothers planned to start glazing the low houses on October 1, 1999, but could not begin this work until March 31, 2000, 6 months or 182 calendar days later than planned. C4 Supp. 08 00493; H.Tr., Ford, 18:266, 290. Appellant argues that this 6-month delay was due to numerous design deficiencies, for which AOC was responsible and for which AOC failed to timely respond to Clark's RFIs. Appellant identifies these asserted design deficiencies as the rolling ladders, work stage platform, in-swing vents, belt course beam, Palm

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<sup>365</sup> As specifically discussed below, we also deny the two related change claims for providing support for the finned tube radiation.

<sup>366</sup> We note that, in contrast to other claims submitted under this appeal, Rough Brothers' claims are well-organized and sufficiently supported by detailed records that explain and evidence the costs it pursues.

House/Garden Court expansion joint, crickets, and vestibule framing.<sup>367</sup> App. PFF ¶¶ 143-73. Appellant contends that, until the design issues identified above were resolved, Rough Brothers could not fully design and fabricate its glazing system. App. Reply Brief ¶ 117. In addition, Appellant argues that AOC's requirement that Rough Brothers certify the coordination of its glazing system with Standard Iron's structural aluminum system contributed to the 6-month delay. App. PFF ¶¶ 174-79; see H.Tr., Witt, 19:216-18. Rough Brothers' design and engineering delay claim consists of the extended project management and design and engineering expenses incurred during the 6-month extended pre-installation period (a total of \$91,605 including the markups for overhead and profit). C4 Supp. 08 00493.

AOC disputes that Rough Brothers is entitled to recover damages for this 6-month delay, because the "delay" costs are not project extension costs incurred after the project's originally scheduled completion date of September 2000." Resp. Reply Brief, part 5, tab VI.H, at 35. AOC also objects to Rough Brothers' claimed delay costs for extended project management and design and engineering for this period, arguing that Clark has not demonstrated that the costs for which it seeks recovery are beyond what Rough Brothers would have otherwise incurred in performing the contract. *Id.* at 36. In essence, AOC argues that Clark, on behalf of Rough Brothers, is seeking damages for disruption, and that Clark has not shown that Rough Brothers is entitled to disruption damages. The problem with AOC's arguments is that Rough Brothers has not sought damages purely for disruption, but rather damages for its extended project management period caused by the delay. Clark's appeal of the contracting officer's decision, however, clearly indicates that Rough Brothers' cost claim is for extended project performance. C4 Supp. 08 00492-93.

As discussed above, a contractor may recover damages for non-critical path delay, such as for the extended project performance here, where the contractor establishes the "fundamental facts of liability, causation and resultant injury," see *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199; *Paul Hardeman, Inc. v. United States*, 186 Ct. Cl. at 749, and where there is no concurrent delay. *Avedon Corp v. United States*, 15 Cl. Ct. at 652-53, 657-61.

Here too, for the most part, Appellant presented its claimed design and engineering delay on a "total delay" basis. That is, Appellant has merged all of the asserted design deficiencies that it asserts caused delay during this period and the allegedly unwarranted requirement for certification of coordination, and asserts that all of these problems are AOC's responsibility and contributed to the 6-month delay.

Specifically, as described above, we find that AOC was indeed responsible for some of the claimed deficiencies (e.g., vestibule framing and crickets).<sup>368</sup> However, we also find that AOC is

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<sup>367</sup> Although not cited by Clark in its briefs, Mr. Witt also identified the contract requirement for a laminated glass edge seal and the failure to identify concrete sill locations as design problems that contributed to Rough's delay. See H.Tr., Witt, 19:100-01, 111-12. These matters were not sufficiently explained for us to determine whether or not they were design deficiencies.

<sup>368</sup> The record also shows that AOC admitted liability for the design deficiencies associated with the belt course beam in the contracting officer's final decision for this change. COD, Palm House Belt Course Beam.

not responsible for the asserted design deficiencies associated with the Palm House/Garden Court expansion joint (Clark Change Order No. 810238) and the in-swing vents (Clark Change Order No. 810042), where Clark was responsible for the elements' design, fabrication, and installation. Moreover, we found above that AOC was not responsible for any asserted delay associated with Rough Brothers coordinating its work with that of Standard Iron because such coordination was otherwise required by the contract.

In its arguments, Appellant has not identified or segregated alleged time delays associated with each claimed deficiency or associated with the coordination requirement. As discussed above, the problem with such an analytical approach is that where, as here, it is found that AOC is not responsible for all the asserted design deficiencies and it is found that the coordination requirement is a requirement of Clark's contract, this approach will not satisfy Appellant's burden to separate delays, for which it may have been responsible, from those for which AOC would be responsible, so as to apportion a particular period where Rough Brothers was delayed solely by government action with no concurrent delay. See *Morganti Nat'l, Inc. v. United States*, 49 Fed. Cl. at 135. Here, with the exception of the rolling ladders and work stage platform issues (discussed below), Appellant has not provided us with any means of identifying the amount of delay that would be associated with design deficiencies for which AOC was responsible, as opposed to matters for which Clark was responsible. Thus, for these claimed delays, Appellant has not satisfied its burden of showing that its claimed damages are for delay for which AOC was solely responsible with no concurrent delay. *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198; *Avedon Corp v. United States*, 15 Cl. Ct. at 653.

With respect to the rolling ladders and work stage platform, while not argued by Clark, the record does contain evidence showing the amount of delay specifically attributable to the resolution of these particular issues. That is, on May 13, 1999, Clark submitted to AOC a request for an extension of contract time of 73 work days for the rolling ladders and work stage platform problems. This request was supported by a number of documents, including a fragnet showing a 73 work day schedule delay in Rough Brothers' activities as a result of the rolling ladder and work stage platform issues. C4 Supp 21 1037-60. As explained by Rough Brothers at that time, it had "planned to have dies cut and manufacture samples for the mock-up from February 1 to March 22 [and] [t]he delay in receiving complete information to develop extrusion drawings caused [this] activity . . . to be delayed 73 days." C4 Supp. 21 1058.

We have found no evidence in the record that AOC contemporaneously or otherwise rebutted or responded to Clark's fragnet analysis. Moreover, AOC has not referenced, nor have we found, any evidence showing flaws in the logic of the fragnet analysis. Finally, we note that this delay is not inconsistent with Clark's October 31, 1999 schedule update, which indicated a negative float of 77 work days for this activity. Resp. Exh. 59. Accordingly, unlike the other design issues that Clark asserts caused the total 6-month delay, the record does provide the means to apportion the amount of delay associated with the rolling ladders and work stage platform problems, should the delays based upon these problems be determined to be solely AOC's responsibility.

However, AOC correctly asserts that these matters were not its responsibility, but were Clark's in implementing the section 13123 performance specification requirements. Specifically, with respect to the rolling ladders, Clark was required under section 13123 to:

[f]urnish aluminum components necessary to fabricate a rolling ladder, capable of supporting normal and customary loads from workers and their equipment including glass sections. Ladders shall include all rollers and brackets for a complete installation. Provide extruded aluminum ladder supports in conjunction with aluminum ridge.

R4, K0907. With respect to the work stage platform, the specification provided for a:

- A. [c]ustom designed and fabricated aluminum platform, suspension system and motorized controlled.
1. Adjustable folding guide wheels.
  2. OSHA approved for type of service intended, specifically repair and maintenance of conservatory glazing and operations systems.
  3. Removable aluminum railings.
  4. Design Load: 1500 pounds.
  5. Refer to Drawings for details.

R4, K0910. As the specification language indicates, the contract left to Clark's ingenuity and discretion the performance details of, and means for, providing the rolling ladders and work stage platform, which indicates that these are performance specifications. Indeed, Mr. Witt, Rough Brothers' project manager, agreed that it had design responsibility for the rolling ladders and work stage platform. H.Tr., Witt, 19:264.

However, even where the contractor is required to perform pursuant to a performance specification, if the contract specification is impossible or commercially impracticable to perform, a contractor is entitled to recover its cost of performance while attempting to satisfy the specification. *See Northrop Grumman Corp. v. United States*, 47 Fed. Cl. 20, 85-86 (2000). It is the contractor's burden to establish that a performance specification was impossible or impracticable to achieve. *See L.B. Samford, Inc.*, ASBCA No. 32645, June 26, 1992, 93-1 BCA ¶ 25,228 at 125,660; *Newell Clothing Co.*, ASBCA No. 28306, May 23, 1986, 86-3 BCA ¶ 19,093 at 96,509, *aff'd*, 818 F.2d 876 (Fed. Cir. 1987).

Here, the record shows that, beginning early in contract performance and continuing through April 2000 (when the requirement for the rolling ladders was deleted from the contract), Rough Brothers and Clark, through numerous RFIs, correspondence, and meetings, sought information from AOC/DMJM concerning the intended operation, location, and use of the rolling ladders and work stage platform. *See e.g.*, C4 Supp. 21 0807 (Clark RFI No. 61, February 2, 1999), C4 Supp. 21 0847 (Clark RFI 60, February 2, 1999); H.Tr., Witt, 19:59-62. In his deposition, Mr. Witt testified that the inability to design the rolling ladders affected the design of the gutter and ridge extrusions in the Palm House, Garden Court and low houses, *see D.Tr.*, Witt, 87-88,

and the inability to design the work stage platform “literally could have affected every component of the glazing system.” *Id.* at 92.

Rough Brothers consulted with Mr. O’Hanlon, whom the Board accepted as an expert witness qualified in the areas of structural engineering and conservatory renovations, with respect to designing the rolling ladders and work stage platform for this contract. Mr. O’Hanlon testified that, despite much work on Rough Brothers and his part, a design could not be accomplished for the work stage platform or rolling ladders. H.Tr., O’Hanlon, 18:99-101. Mr. O’Hanlon explained with regard to the work stage platform that there were too many unanswered design difficulties, such as how the platform, which was to ride up the side of the structure, would “jump over the eave” and how to comply with the “very high loading requirements” imposed by the Occupational and Health Administration (OSHA) on a glass structure. *Id.* at 18:99-100. With regard to the rolling ladders, Mr. O’Hanlon testified that there were “similar difficulties in terms of connecting back to the existing structure, and supporting the load, the OSHA or the design loads provided by the engineer.” *Id.* at 18:100-01.

AOC ultimately deleted the requirement for the work stage platform from contract on April 7, 1999. *See* Resp. Exh. 73; H.Tr., Brainerd, 28:44. The requirement for the rolling ladders was deleted from the contract on April 5, 2000. *See* A4 Supp. R00827; H.Tr., Brainerd, 28:105. Mr. O’Hanlon indicated that the deletion of these requirements was necessary because AOC agreed that the rolling ladders or work stage platform were not “buildable or functional,” inasmuch as they were an “impractical construction.” H.Tr., O’Hanlon, 18:99-100. The gist of Mr. O’Hanlon’s testimony is that the construction of the rolling ladders and work stage platforms was impossible.

In the absence of evidence, or even argument, from AOC rebutting Mr. O’Hanlon’s testimony regarding the impossibility of designing and building the work stage platform and rolling ladders or Mr. Witt’s testimony as to the delay this caused Rough Brothers, we conclude that the rolling ladders and work stage platform performance specification requirements were impossible to design and build, and that the inability to design these elements delayed Rough Brothers design and fabrication of the glazing system. Since these requirements were impossible, AOC was responsible for the delay attributable to Kirlin’s attempt to comply with these impossible requirements. *Northrop Grumman Corp. v. United States*, 47 Fed. Cl. at 85-86.

As indicated above, Rough Brothers submitted a fragnet showing a 73-work day delay attributable to the work stage platform and rolling ladders. The contents of this fragnet, which support Rough Brothers’ assertion that these issues delayed its performance for the claimed period of time, have not been rebutted by AOC. Thus, we find that Rough Brothers’ performance was delayed by 73 work days or 102 calendar days of the 182 days of delay claimed for this period because of the problems involving the work stage platform and rolling ladders.<sup>369</sup> On the other hand, Appellant has not shown that AOC was solely responsible for the other 80 calendar days of claimed delay during this period because, as discussed above, the causes cited for remainder of this delay are concurrent and attributable to both AOC and Clark with no means provided to apportion the rest of the 182-day delay.

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<sup>369</sup>  $7/5 \times 73$  work days = 102.2 calendar days.

We next consider whether the critical path delays in Standard Iron's critical path activities (most of which we found were Appellant's responsibility) were concurrent to this claimed delay, so as to preclude Rough Brothers' recovery of delay damages. We consider this issue because of the obvious dependency of Rough Brothers' Palm House critical path work on Standard Iron's critical path Palm House structural aluminum erection activities. Specifically, because AOC's contract is with Clark, not Rough Brothers, Rough Brothers would not be entitled to delay damages here if it had been unable to begin installation of the glazing system regardless of the delay caused by AOC because of delay in Standard Iron's activities, inasmuch as the Standard Iron delay would then be considered to be a concurrent cause of delay to Rough Brothers' work. See *Smith v. United States*, 34 Fed. Cl. 313, 325 (1995); *Avedon Corp. v. United States*, 15 Cl. Ct. at 652-53.

While no CPM analysis on this point has been presented to the Board, we find that the Standard Iron critical path delay was not concurrent to Rough Brothers' claimed delay from October 1, 1999 to March 31, 2000. In this regard, we note that Rough Brothers originally intended to begin work on the West Low House on October 1 and its critical path Palm House work was to begin on November 17. H.Tr., Ford, 18:290; Resp. Exh. 53. According to the baseline schedule, Standard Iron was to begin its critical path Palm House aluminum structure erection activity on July 20, 1999, Resp. Exh. 53, but, for the reasons detailed above, was delayed by 274 calendar days before it was actually able to begin this activity on April 19, 2000. App. Exh. 92 at 12. Although Rough Brothers actually began its glazing activities on the site on March 31 or April 1, 2000, it did not start its critical path Palm House glazing activities until September 25, 2000. *Id.* at 18; H.Tr., Ford, 18:290. Thus, whereas the baseline schedule indicates that Rough Brothers was to begin its on-site activities approximately 2½ months after Standard Iron was to begin its critical path Palm House erection activity, Rough Brothers actually began its glazing activities several weeks before Standard Iron began its critical path structural aluminum erection activities. It therefore seems apparent that Rough Brothers was able to resequence its installation activities to first accomplish work in other areas of the project before commencing its critical path Palm House activities on September 25, 2000, so that the delay in Standard Iron's activities was not concurrent to Rough's delay here.

In support of its claim for 6-month extended project management and design and engineering costs, Rough Brothers has submitted certified payroll records for its project manager and green house designers for the period of the delay, and expense reports for the same period. See C4 Supp. 08 00658-73. DCAA found that Rough Brothers' claim, to include its project management expenses, was prepared in accordance with the FAR cost principles, consistent with Rough Brothers' normal accounting practices, and was acceptable as a basis for settlement.<sup>370</sup>

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<sup>370</sup> In its reply brief, AOC argues, without citation to any supporting evidence, that Rough Brothers' project management and travel expenses are overhead items, and therefore it is inappropriate to apply an overhead rate to these items. Resp. Reply Brief, part 5, tab VI.H, at 36. AOC's argument ignores DCAA's audit report, which does not question the application of overhead to the project management costs or travel expenses. Moreover, Mr. Ford of Rough Brothers testified that the project manager (Mr. Witt) and the green house designers were all dedicated full time to this contract. H.Tr., Ford, 19:18, 22.

DCAA Audit Report of Rough Brothers at 4. Rough Brothers' cost claim for the 6-month delay is \$91,605, which consists of direct costs of \$75,707 to which Rough Brothers' applies a 10-percent overhead rate and a 10-percent profit rate. C4 Supp. 08 00493. AOC has not here rebutted Rough Brothers' adequately documented delay claim here.<sup>371</sup>

In sum, we conclude that Rough Brothers is entitled to recover its damages for the 102 calendar days of delay associated with the rolling ladders and work stage platform. As noted above, Rough Brothers has claimed extended project costs of \$91,605 for the period of October 1, 1999, through March 31, 2000, a period of 182 calendar days. We therefore calculate that Rough Brothers is entitled to recover \$51,339 for the 102 calendar day delay caused by AOC.<sup>372</sup>

## 2. Palm House Delay

Rough Brothers also claims a second unrelated period of delay as a result of the suspension of its work on the Palm House. C4 Supp. 13 0399-0401. As indicated, Rough Brothers began its on-site installation of the glazing system in April 2000. On December 22, 2000, Clark directed Rough Brothers to stop all work associated with glazing the Palm House as a result of the determination by SGH and Clark of potential structural design deficiencies to the facility. On April 10, 2001, Clark notified Rough Brothers that the Palm House structural issues had been resolved and that Rough Brothers could recommence its glazing system work. *Id.* at 0401. Rough Brothers asserts that while it resequenced certain work and performed in other outlying areas of the Botanic Garden, its work on the Palm House was delayed for a period of at least 15 weeks. Rough Brothers' Palm House delay claim consists of additional field costs (*i.e.*, on-site supervision and storage) as well as extended project management expenses during this time period, totaling \$41,405, including 10-percent markups for overhead and profit.<sup>373</sup> C4 Supp. 08 00494.

Rough Brothers' Palm House delay claim first seeks the field supervision and on-site office and storage costs it incurred during the period from December 22, 2000 to April 10, 2001. For all its costs here, Rough Brothers has provided sufficient documentation evidencing the amounts it claims (*e.g.*, certified payroll records, vendor invoices), and we find these costs to be reasonable and allowable. C4 Supp. 13 0582-609. Rough Brothers' Palm House delay claim also seeks

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<sup>371</sup>We also determine that Rough Brothers' extended project management expenses, while not an on-site cost of performance, are not prohibited by the contract's No Damages for Delay clause. Rough Brothers' project manager worked primarily at the contractor's facility in Cincinnati, Ohio, and only made trips to the Botanic Garden job site as necessary. H.Tr., Ford, 19:19. Rough Brothers' claim here thus essentially seeks the recovery of a direct, but off-site, contract expense. We note that the No Damages for Delay clause expressly makes unallowable only the recovery of a contractor's indirect off-site contract expenses. We reiterate that we will strictly construe the language of restrictive clauses like this one. *E.C. Ernst, Inc. v. Manhattan Constr. Co. of Texas*, 551 F.2d at 1029. Accordingly, we find that Rough Brothers' project management expenses are not barred by the contract.

<sup>372</sup>  $102/182 \times \$91,605 = \$51,339$ .

<sup>373</sup> Computational errors as to its profit markups here resulted in a net \$1,007 understatement of the amount claimed, which Rough Brothers has stated it does not seek. H.Tr., Ford, 19:42.

“extended project management expenses” for the same time period, which the contractor claims as a direct expense. The subcontractor again provided travel logs and certified payroll records sufficiently evidencing the amounts claimed. C4 Supp. 13 0610-14. Also, as noted, the company’s project manager here worked exclusively on the renovation contract and Rough Brothers accounted for its project management costs in a manner consistent with its accounting practices.<sup>374</sup> H.Tr., Ford, 19:18-19.

We find that Rough Brothers is entitled to recover delay damages incurred to its work from December 22, 2000 to April 10, 2001. As set forth above, the Palm House structural problems were the result of AOC’s defective design and this caused the bulk of the delay during this period. However, as discussed above, not all of the delay during this period while Rough Brothers’ work was suspended was AOC’s responsibility. That is, as found in our analysis of Period 4 above, while AOC was responsible for 103 days of the total 108 days of delay during this period, Clark was responsible for 3 days of delay and there were concurrent causes for the other 2 days of delay. Thus, Rough Brothers is entitled to recover 103/108 of its \$41,405 in allowable delay damages during this period, that is, \$39,488.

### **B. Acceleration Claims**

Rough Brothers claims \$225,938 in acceleration damages. C4 Supp. 08 00495-96. Rough Brothers argues that on at least three separate occasions (*i.e.*, April 14, 2000, March 6, 2001, and June 20, 2001), the subcontractor was directed by Clark to accelerate its progress on the Botanic Garden project. C4 Supp. 13 0402. Rough Brothers asserts that based upon the directives to accelerate performance, it incurred expedited manufacturing and shipping expenses as well as overtime premium expenses.

The first portion of Rough Brother’s acceleration claim consists of its labor premium costs (*i.e.*, overtime) it incurred for both its field supervisor and subcontractor workforce in April and May 2000 (totaling \$14,244 with overhead and profit markups). C4 Supp. 08 0496. These acceleration costs are not recoverable. While Clark expressly ordered Rough Brothers (and its other subcontractors) to accelerate their work in the Spring of 2000, for the reasons detailed above we find above that this did not constitute a constructive acceleration on the part of AOC because of the absence of a condition precedent--the existence of an excusable critical path delay.

The second portion of Rough Brother’s acceleration claim concerns the acceleration costs incurred in 2001. As discussed above, AOC’s February 5, 2001 cure notice constituted a constructive acceleration order to Clark and its subcontractors, so that reasonable acceleration costs incurred in response to the order are recoverable. This portion of Rough Brothers’ claim has two elements.

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<sup>374</sup>DCAA did not take exception to these claimed costs. DCAA Audit of Rough Brothers.

The first element consists of its expedited manufacturing and shipping expenses. Specifically, Rough Brothers seeks the recovery of the additional costs it incurred to expedite anodizing<sup>375</sup> and shipping on various occasions during the 2001 timeframe (totaling \$29,483 with overhead and profit markups). C4 Supp. 08 00496. Rough Brothers' claim is supported by vendor invoices and other documents sufficiently demonstrating the premium costs it incurred for expedited anodizing on three occasions between July and September 2001, as well as expedited shipping on nine occasions between February and August 2001. C4 Supp. 13 0615-40; *see* H.Tr., Ford, 19:22-29. The second element of this portion of Rough Brothers' acceleration claim is for the labor premium costs (*i.e.*, overtime) it incurred for both its field supervisor and subcontractor workforce from March–August 2001 (totaling \$182,212 with the overhead and profit markups). *See* C4 Supp. 08 00496. Rough Brothers claim here consists of only the overtime costs it incurred. H.Tr., Ford, 19:34.

The record establishes that all the expedited anodizing and shipping costs and overtime costs claimed here by Rough Brothers were incurred subsequent to and in response to the government's constructive acceleration order. While AOC argues that Rough Brothers should not have had to accelerate its anodizing and shipping in light of the fact that the Palm House glazing system work had been suspended from December 2000 until April 2001, *see* Resp. PFF, part 1, § I.B.3, tab 8, the record sufficiently indicates that the required resequencing of work because of the suspension of work did not make this possible. H.Tr., Ford, 19:26-27.

We find Rough Brothers' claimed \$211,695<sup>376</sup> in acceleration costs for overtime and for expedited anodizing and shipping for this period are reasonable. However, as discussed above, because this acceleration flowed from concurrently caused delay, Rough Brothers is only entitled to recover acceleration damages based on the excusable portion of the total contract delay. Thus, we find that Rough Brothers is entitled to recover 122.4/421 of its otherwise allowable acceleration costs for this period, that is, \$61,547.

### C. Claim Preparation Costs

Rough Brothers' seeks its claim preparation costs in the amount of \$35,000. These costs are for "project management, accounting, attorney's fees and claim consultant fees in preparing its claim which will exceed \$35,000." C4 Supp. 13 0403. As explained by the company's representative, Rough Brothers' claim is based on its estimated legal and claims consultant services in developing and prosecuting its claims against AOC. *See* H.Tr., Ford, 18:287, 301-02, 19:32. We find these costs are unallowable in nature. As set forth above in our discussion of Clark's proposal preparation costs, the expenses incurred by a contractor to prepare and pursue claims against the government are generally not recoverable. *See Singer Co. Librascope Div. v. United States*, 215 Ct. Cl. at 281. Rough Brothers claimed costs here are clearly for claim preparation and are therefore denied.

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<sup>375</sup> Anodizing is a chemical treatment process by which a protective coating is added to metal products. H.Tr., Ford, 18:297. Rough did not perform the anodizing process itself for the aluminum pieces it fabricated as part of the Botanic Garden glazing system, but utilized a chemical treatment vendor. *Id.*

<sup>376</sup> \$29,483 + \$182,212 = \$211,695.

#### D. Additional BOCA Purlins, Clark Change Order No. 810028

Clark claims \$100,053 on behalf of itself and Rough Brothers for the design and provision of additional Palm House purlins. Appellant argues that Rough Brothers found that to satisfy the contract loading requirements, additional purlins were necessary to support Rough Brothers' glazing system, and that the purlins are structural elements under specification 05140 (for which AOC was responsible) and were not under specification 13123 (for which Clark would be responsible). Clark reasons that the government-provided contract design, which did not include these additional purlins, was defective, and that providing these additional purlins constituted a constructive change to the contract. App. PFF ¶¶ 1016-19.

Under the Changes clause, Clark is entitled to an equitable adjustment for a constructive change to the contract. A constructive change occurs when the government requires work beyond contract requirements. Before it can recover, the contractor must show that the government ordered it, by words or actions, to perform the additional work. See *Elastomeric Roofing Assocs., Inc. v. United States*, 26 Cl.Ct. 1106 (1992). A constructive change does not occur where a contractor on its own initiative, and without government order, action or approval, performs additional contract work. *Id.* at 1118. A constructive change also occurs where additional efforts are incurred by a contractor to overcome defective design specifications. See *Hol-Gar Mfg. Corp., v. United States*, 175 Ct. Cl. at 523.

As explained below, we do not find that Clark's design and provision of the additional purlins beyond those required by the contract was a constructive change to the contract. Instead, we find that the additional purlins were required to support a glazing system design, which Clark and its subcontractor, Rough Brothers, elected to use, and were not due to any action or direction by AOC. In addition, we find that the need for the additional purlins was not caused by defective design specifications.

In accordance with Clark's obligation under the contract to provide design calculations from a professional engineer, see R4, K0901, as indicated above, Rough Brothers employed Mr. O'Hanlon of Ove Arup, a professional engineer, who performed a structural analysis of Rough Brothers' glazing system design.<sup>377</sup> H.Tr., O'Hanlon, 18:75-76. As described above, the contract required the provision of a custom-designed aluminum framed glass-enclosed conservatory and, as amended by amendment No. 9, attachment 4, required the design to replicate the originally existing glass size and glazing bar cap profile of the Botanic Garden conservatory. R4, K0897-99, K1847.

Rough Brothers' custom design replicated not only the existing glass size and glazing bar cap profile, but also the originally existing glazing bar profile.<sup>378</sup> Mr. O'Hanlon testified that the

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<sup>377</sup> As indicated, Mr. O'Hanlon was qualified and accepted as an expert in structural engineering and conservatory renovation. H.Tr., O'Hanlon, 18:120-21.

<sup>378</sup> Mr. O'Hanlon testified that he did not design the glazing bar, but was provided the glazing bar design, which replicated the originally existing glazing bars, by Rough Brothers. H.Tr., O'Hanlon, 18:153, 157.

glazing system primarily consisted of the glazing bars (also called rafters), the glass, and the glazing bar caps. The glazing bars are the elements upon which the glass sits, and the glazing bar caps screw into the glazing bar and hold the glass in place. H.Tr., O'Hanlon, 18:68-69, 163-64; Resp. Exh. 39. The glazing bar and glazing bar cap are different elements of the glazing system. See H.Tr., Witt, 19:258.

In April of 1999, Ove Arup made its first submission to Rough Brothers of calculations supporting Rough Brothers' design as of that time.<sup>379</sup> See App. Exh. 82. Mr. O'Hanlon found that when applying the BOCA 1993 loads, as required by the contract, and using the Rough Brothers' glazing system design, including in particular Rough Brothers' glazing bar design, that

the rafters [glazing bars] as designed, as being replicated, could not span, in some areas, particularly – well exclusively because of the higher snow loads it needed to resist because of the code loads, the spans of the rafters were too large, that they needed essentially to be cut in half.

H.Tr., O'Hanlon, 18:94. Ove Arup recommended that, to reduce the span of the glazing bars, additional purlins be added to the structure. App. Exh. 82.

On May 5, Ove Arup's calculations supporting Rough Brothers' design were provided to AOC. See A4 Supp. R00457. On May 21, 1999, Rough Brothers wrote Clark regarding the design calculations in Appellant's Exhibit 82, stating that the additional purlins identified by Ove Arup were not Rough Brothers' obligation to provide because its subcontract with Clark did not require the provision of structural elements necessary to support the glazing system. C4 Supp. 21 1153. On May 24, Clark forwarded Rough Brothers' May 21 letter to AOC and informed AOC that the additional purlins appeared to be a change to the contract; Clark wrote, "we do not intend to proceed with this work until we receive a formal written notice to proceed." C4 Supp. 21 1219.

On July 2, 1999, Rough Brothers informed Clark that it needed AOC's approval of the information contained in Ove Arup's design calculations because they were critical to the overall design of the conservatory glazing system. Clark forwarded this Rough Brothers' transmittal to AOC on that same date. A4 Supp. R00458. On July 13, AOC responded to Clark, stating that AOC did not agree that the addition of the purlins was a contract change; specifically, AOC noted that:

[t]he conservatory was specified as a system (specification 13123), not an assembly of individual, unrelated pieces. The designer of the system can take one of two possible courses of action to meet the requirements of the documents. The first is to design the glazing bars for the existing purlin span. The second is to add purlins and use a lighter glazing bar. Neither course of action [is] a change to the contract.

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<sup>379</sup> Mr. O'Hanlon testified that Rough Brothers' design was not complete at that time, as "[s]everal elements were still in development" and that Rough Brothers was still "awaiting some field verification of certain things." H.Tr., O'Hanlon, 18:91-92.

Please advise as to your choice of action and revise accordingly.

C4 Supp. 21 1667.

Rough Brothers informed Clark that Rough Brothers disagreed with AOC's determination that the addition of the purlins was not a change to the contract and also disagreed that it could provide a different glazing bar design that would make the addition of the purlins unnecessary. Specifically, Rough Brothers stated that

Amendment No. 9, Attachment 4 Part II paragraph 2 states "The conservatory framing system to match the existing glass size shall be designed by the Offeror in accordance with the requirements of Section 13123 and other related sections. . . ." Our interpretation of framing system is that the glazing bar, part of the glass framing system, was to match, as closely as possible, the original glazing bar.

C4 Supp. 21 1733-34. Clark forwarded this Rough Brothers' letter to AOC on July 27. Without any further specific direction from AOC, Rough Brothers chose not to change its glazing bar design, and Rough Brothers obtained and installed the additional purlins that Ove Arup found were necessary to support Rough Brothers' glazing system design. Clark paid Rough Brothers \$100,053 for the design and provision of the additional purlins, and made this constructive change claim to AOC. The contracting officer has denied that designing and providing the additional purlins was a contract change. COD, Additional BOCA Purlins.

There is no dispute that Rough Brothers' glazing system design required the additional, so-called "BOCA purlins" to satisfy the contract loading requirements of BOCA 1993. In this regard, the fact that Rough Brothers' glazing system design needed the additional purlins to satisfy the contract loading requirements is amply supported by Ove Arup's reports, *see* App. Exh. 82; Resp. Exh. 80, and by Mr. O'Hanlon's testimony, H.Tr., O'Hanlon, 18:94. The point of contention in this change order claim is whether it was Rough Brothers' particular design choice for its glazing system that required the additional purlins, such that responsibility for adding the purlins is Clark's and not AOC's.

As is described above, the design and provision of the glazing system is governed by section 13123, as amended by amendment No. 9, attachment 4. Section 13123, which required Clark to provide a "custom heavy duty quality aluminum framed glass enclosed conservatory," is primarily a performance specification that left the design of the glazing system to Clark. Amendment No. 9, attachment 4, amended section 13123 in several specific regards, including, as pertinent here, requiring Clark to replicate the originally existing glass size of the conservatory (two-foot square, as opposed to four-foot square as originally specified in section 13123) and to replicate the existing glazing bar cap profile. The amendment also required Clark to design the conservatory framing system to match the revised glass size, to revise contract drawings for the roof plans and elevations to reflect the revised glass size, to provide all necessary supporting members for the revised glass size, and to fabricate such necessary supporting members in accordance with sections 05140 and 13123. R4, K1847.

Rough Brothers interpreted amendment No. 9, attachment 4, as requiring Rough Brothers to replicate the original existing glazing system to a large degree. *See* H.Tr., Witt, 19:52; *see also* H.Tr., O'Hanlon, 18:114 ("the change in the amendment that essentially changed the glass size and instituted a new design philosophy which was replicate the existing as much as possible locked everything down.") Based on the Rough Brothers' interpretation, this meant that, in addition to replicating the originally existing glass size and glazing bar cap profile, Rough Brothers was to replicate the existing glazing bar profile. *See* H.Tr., O'Hanlon, 18:103-04. As noted above, Ove Arup found that Rough Brothers' glazing system design required additional purlins as support to satisfy the contract loading requirements.

AOC effectively informed Rough Brothers in July of 1999 that Rough Brothers did not need to replicate the existing glazing bar design and that Rough Brothers could design the glazing bar for the existing structure so that the additional purlins were not necessary. *See* C4 Supp. 21 1667. The record establishes that the conservatory structure, as designed by AOC/DMJM, would support Rough Brothers' glazing design without the addition of the "BOCA purlins," if that system had included a glazing bar design of greater height. Specifically, Mr. O'Hanlon explained at the hearing that, as suggested by AOC, the height of the glazing bars could in fact be increased to span the purlins as provided in the contract design, but that this would reduce the light coming into the building.<sup>380</sup> *See* H.Tr., O'Hanlon, 18:104-05. Although Mr. O'Hanlon did not believe that increasing the height of the glazing bar, as opposed to adding the purlins, was a good choice, he effectively acknowledges in his testimony that increasing the height of the glazing bar would have made the addition of the "BOCA purlins" unnecessary, and Clark does not argue otherwise. *Id.*

The Board finds, contrary to Clark's apparent belief, that amendment No. 9, attachment 4, did not require the contractor to replicate the originally existing glazing bar design. As described above, amendment No. 9, attachment 4, very specifically identified those parts of the glazing system that had to replicate the originally existing design, that is, the glass size and glazing bar caps. Unlike the specific identification of the glass size and glazing bar caps, the amendment does not address specifically the glazing bar design. The Board finds that although the requirements to replicate the existing glass size and glazing bar cap design are design requirements, the specifications governing the glazing system design, as amended by amendment No. 9, attachment 4, remained primarily a performance specification. That is, as pertinent here, the design of the glazing bar was left to Clark's and Rough Brothers' discretion, skill and ingenuity. Moreover, as noted above, AOC essentially informed Clark that it did not need to replicate the existing glazing bar design. C4 Supp. 21 1667.

With respect to Clark's concern that increasing the height of the glazing bar would reduce the amount of light coming into the building, this too shows that Clark had choices in designing the glazing bar. Although Clark believes that reducing the light entering the building is "problematic," *see* App. PFF ¶ 1018, the contract specifications are silent as to the amount of

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<sup>380</sup> Mr. O'Hanlon noted that the more modern style originally sought by section 13123 (four-foot square glass size), before the issuance of amendment No. 9, attachment 4, allowed less light to enter the building than Rough Brothers' more historical design. *See* H.Tr., O'Hanlon, 18:133-34.

light the glazing system design must allow into the building. In fact, the record is silent as to the extent of the reduction in light caused by using a higher glazing bar design or what specific impact this reduction of light would have upon the conservatory's essential purpose.<sup>381</sup> Although we acknowledge Mr. O'Hanlon's expert opinion that reducing the amount of light into the conservatory was not a good choice, there is no indication in the record that Clark's arguments to the Board that increasing the height of the glazing bars would reduce the amount of light into the building were presented to the contracting officer during the contract.<sup>382</sup> Thus, it appears that Clark made its election on its own initiative without any direction or decision from the government.

In sum, the Board finds from this record that there is simply no direction or order, constructive or otherwise, to Clark requiring the contractor to provide the additional "BOCA purlins." To the contrary, the record shows that it was Clark's design choice to replicate the originally existing glazing bar that created the need for the additional purlins, even though AOC had informed Clark that it need not replicate the existing glazing bar design. AOC also informed Clark that if the contractor elected to replicate the existing glazing bar design, which would require additional purlins to support the glazing system, this would be Clark's responsibility section 13123. Without further direction from AOC, Clark chose to replicate the existing glazing bar design and to install additional purlins, which were only required by reason of Clark's design choice.

Clark nevertheless argues that the additional purlins are structural elements, whose purpose is to "reduce the unbraced length of the main trusses," and therefore, because AOC is responsible for the conservatory structure under the design specification 05140, AOC is responsible for the addition of the purlins. App. PFF ¶ 1016; App. Reply Brief at 83-84. The problem with Clark's argument here is that it ignores the testimony of its expert witness, Mr. O'Hanlon, who testified that the additional purlins were not necessary for the Palm House structure, but were required to support the glazing system.<sup>383</sup> See H.Tr., O'Hanlon, 18:205, 209. In other words, the additional purlins were not required because of a defect in the contract design, but were required because the particular glazing system design chosen by Rough Brothers required the additional support.<sup>384</sup>

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<sup>381</sup> The Board is aware of Mr. O'Hanlon's general testimony that conservatories are "machines for growing plants" and "the object being to bring in as much light and air to grow plants in, and heat." H.Tr., O'Hanlon, 18:43. This testimony does not address, however, the amount of light differing glazing system design choices offer or specifically here whether the reduction in light associated with a higher glazing bar would cause the conservatory to fail in its essential purpose.

<sup>382</sup> As indicated elsewhere, this failure to communicate was typical of the parties' conduct during the contract.

<sup>383</sup> That these purlins may also serve the function of helping support the rest of the structure does not make them AOC's responsibility, given that they were only added, without AOC's direction, to satisfy Rough Brothers' performance specification obligation to provide a custom glazing system.

<sup>384</sup> We note that Mr. Lakey, AOC's structural engineering expert, reported, "We believe this [that is, amendment No. 9, attachment 4] gives the contractor the responsibility for the design of the glass and glass support, *i.e.*, purlins, etc." A4 Supp. R00862 at 10.

Therefore, we find that the Appellant has failed to establish that the design and provision of the additional "BOCA purlins" was a constructive change to its contract, and deny this change claim.

#### **E. In-Swing Vents, Clark Change Order No. 810042**

Clark requests an equitable adjustment of \$24,128 on behalf of Rough Brothers (\$9,661) and Judd (\$14,467) for providing additional rows of in-swing vents at the Palm House and Garden Court, and the additional electrical wiring and motors associated with the additional in-swing vents.<sup>385</sup> R4, COF 4523, 4795. The record supporting this claim presents a particularly tangled web of facts, which the parties have done little to explain, either through citation to the record or to testimony presented at the hearing.

On June 8, 1999, AOC issued Change Order No. 25, which directed Clark to delete the Palm House belt course "at elevation +30" and convert outward swinging vents "at elevation +33" to in-swing vents. R4, 4865. The record indicates that this change was made because AOC and DMJM had determined "that the design should be simplified for visual and maintenance reasons by grouping all the vents together and deleting the belt course." R4, COF 4575.

In response to this change order, Clark submitted Rough Brothers' June 28 cost proposal for deleting the belt course, changing the out-swing vents to in-swing vents, and also adding in-swing vents in the Palm House. Specifically, Rough Brothers proposed a \$7,475 credit to AOC for the deletion of the belt course and requested payment of \$14,468 for providing additional in-swing vents to the Palm House.<sup>386</sup> R4, 4859-60. Specifically, Rough Brothers stated with regard to the additional in-swing vents:

In order to make this change as economically as possible I am looking at this change from the aspect of changing as little as possible of existing structure connections (e.g. purlin clip locations). Per responses to RFI #s 0105 & 0107 the Palm House ventilation requirements rule the overall opening area required for the in-swing vents and the horizontal lines would then be carried around to the adjacent structures to the extent that is possible. For this reason I am proposing to maintain the original location of the horizontal bands in the Palm House, Garden

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<sup>385</sup> In its final revised claim, Clark identified only costs of \$14,467 for Judd for this claimed change and no costs for Rough Brothers. App. Exh. 139, attach. 7. The Board recognizes that this was an error by Clark, and has considered Rough Brothers' claim of \$9,661 as being part of Clark's change claim here. We also note that although Rough Brothers' cost claim includes costs for 6 additional vent motors, R4, 4860, Judd's cost claim included labor costs for installing 12 motors, R4, COF 4523; there is no explanation in the record for this discrepancy.

<sup>386</sup> Rough Brothers did not claim any costs for changing the out-swing vents in the Palm House to in-swing vents. Rough Brothers' June 28, 1999 claim request was for \$7,693, which was calculated by subtracting a \$7,475 credit for the belt course deletion from the \$14,468 in costs sought for the additional vents, and adding to that sum a 10-percent "markup." R4, 4859-60. Subsequently, Rough Brothers increased its claimed amount, by adding a 10-percent profit factor to the claimed amount, increasing the net claimed by \$769 to \$8,460. R4, COF 4554. On, August 17, 2000, Rough Brothers again increased its claimed net amount of \$8,460 to \$9,661 to reflect its "actual overhead." R4, COF 4529.

Court and Low Houses (approx. 3'+ above the top of trench EL. 14'-11") and then add vents equal to that dimension until the Palm House low ventilation requirements are met. The number of stacked in-swing vents would then be repeated in the Garden Court.

R4, 4859. Attached to Rough Brothers' cost proposal was its May 18, 1999 calculation of the amount of vents that were required to satisfy the amendment No. 9, attachment 4, free area space requirements (explained below). R4, 4861; *see* H.Tr., Krapp, 29:76-77.

As noted above, the primary purpose of amendment No. 9, attachment 4, was to change the required glass size to a smaller size to replicate the originally existing glass size; that is, the amendment changed the required size of the glass in the glazing system from four-foot square panels to two-foot square panels. H.Tr., O'Hanlon, 18:79-80. However, in addition to changing the required glass size, the amendment also stated:

The existing free area of operable louvers/ventilation sash shall be increased to match the free areas indicated on the issued Contract Drawings. If necessary to maintain required free area, additional rows of ventilation sashes from the number of rows indicated on the issued Contract Drawings may be required. For example, the number of rows of ventilation sashes in the south walls of the Garden Court indicated on the issued Contract Drawings will increase since the existing glass size is smaller than the size indicated on the issued Contract Drawings. When this becomes necessary, the rows shall be equally sized to yield an equivalent free area to that shown on the issued Contract Drawings. Operators shall be added for the additional rows and appropriate conduit, wire, etc. [s]hall be provided.

R4, K1847. The "free area of operable louvers/ventilation sash" (which Rough Brothers' May 18, 1999 calculations addressed) refers to the open area when the ventilation sashes are open, which allows air to circulate. *See* H.Tr., Brainerd, 28:39; Krapp, 29:72; Witt, 19:70-71.

On February 24, 2000, in response to Clark's/Rough Brothers' request for an equitable adjustment for providing additional in-swing vents, AOC requested an explanation as to why the additional vents were a change to the contract, in light of the amendment No. 9, attachment 4, free area requirements, and that Clark otherwise substantiate the claim. R4, 4836; H.Tr., Krapp, 29:76-77. This engendered much discussion between Clark/Rough Brothers and AOC. During these discussions, Clark/Rough Brothers repeatedly requested costs for providing additional in-swing vents and finally declined to provide the number of vents in the Palm House and Garden Court that AOC believed, based upon the discussions and calculations provided by Rough Brothers, were necessary to satisfy the free area requirements. *See* R4, 4804-07, 4819, 4830. Ultimately, on August 16, 2000, AOC directed Clark and Rough Brothers to provide five rows of vents in the Palm House and four rows of vents in the Garden Court to satisfy the free area requirements. *See* R4, 4802.

Clark argues that the provision of additional rows of in-swing vents and associated motors and wiring is a change to its contract. App. PFF ¶¶ 1031, 1033-34. AOC responds that under

amendment No. 9, attachment 4, Clark was responsible for providing the additional vents. Resp. PFF, part II, tab IX, at 1-5.

Although not explained by the parties, we find on this record that, contrary to Clark's implication, Clark's change claim here relates to the need to increase the number of vents to satisfy the amendment No. 9, attachment 4, free area requirement, and not to Change Order No. 25, which only deleted the Palm House belt course and changed some out-swing vents to in-swing vents. We find this to be the case because (1) as described above, Rough Brothers' change order cost proposals show a credit for deletion of the belt course and additional costs for increasing the number of vents to satisfy "ventilation requirements" *see* R4, 4859-61; (2) this claim for additional in-swing vents was obviously based upon Rough Brothers' May 18, 1999 calculation of the amount of vents that were required to satisfy the amendment No. 9, attachment 4, free area space requirements, R4, 4861, *see* H.Tr., Krapp, 29:76-77; and (3) Clark nowhere explains how the requirement for additional vents is related to the deletion of the belt course or changing the out-swing vents to in-swing vents.<sup>387</sup>

Amendment No. 9, attachment 4, requires the contractor to match the free area (or open area) shown on the contract drawings and that, with the reduction in glass size, the contractor may be required to provide additional rows of ventilation sashes to maintain the required free area. R4, K1847. Because this requirement only states the end state or objective and leaves to the contractor's discretion, skill or ingenuity how to satisfy this requirement, the Board finds that is a performance requirement that the contractor was required to satisfy at its expense. *See Blake Constr. Co, Inc. v. United States*, 987 F.2d at 745; *J.L. Simmons Co. v. United States*, 188 Ct.Cl. at 689.

As noted above, on August 16, 2000, AOC directed Clark and Rough Brothers to provide five rows of vents in the Palm House and four rows of vents in the Garden Court, apparently having found that this was necessary to satisfy the free area requirement. *See* R4, 4802. Clark does not contend that this number of vent rows, as ordered by AOC, was more than was required to satisfy the free area requirement stated in amendment No. 9, attachment 4. There is also no dispute that amendment No. 9, attachment 4, requires Clark and Rough Brothers to match, in its glazing system, the amount of free area shown on the contract drawings.

Clark instead responds that "[n]othing in the Amendment indicates that the contractor must bear the cost of these additional vents and sashes. At best, the language is ambiguous and should be construed against the drafter--the AOC." Clark argues that because the "required number of vents was different than that originally specified in the contract drawings, as was recognized in Amendment No. 9 Attachment 4," and this amendment did not shift "the costs of those additional vents to the contractor," Clark is entitled to an equitable adjustment for providing the additional vents. App. Reply Brief at 91-92.

This argument is meritless. The performance specification for ventilation sashes added by amendment No. 9, attachment 4, is neither ambiguous nor indefinite. As indicated, under a

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<sup>387</sup> The parties have not addressed the credit offered by Rough Brothers for deleting the belt course under change order No. 25; specifically, AOC has made no claim for this credit.

performance specification, the contractor assumes total responsibility under the contract to do whatever is required to satisfy the requirement. *See Blake Constr. Co, Inc. v. United States*, 987 F.2d at 745. Thus, where such an unambiguous performance specification is included in the contract, as it did here by virtue of amendment No. 9, attachment 4, it is not necessary to state the obvious requirement that the contractor is responsible for the costs of satisfying the performance specification. Here, Clark's best and final offer committed it to performing the contract requirements, including those of amendment No. 9, attachment 4, as part of its contract price.

In sum, we do not find that the addition of the in-swing ventilation sash rows in the Palm House and Garden Court is a change to Clark's contract and therefore deny Clark's change claim.

#### **F. Monitor Gutter Clips, Clark Change Order No. 810323**

Clark claims \$7,284 on behalf of Rough Brothers for the additional labor and material needed to fabricate monitor gutter clips in order to attach its glazing system to the monitor because the monitor, as erected, was not level.<sup>388</sup> R4, COF 5400, 5403-04. As discussed above, Clark claimed that this alleged change caused delay during Period 3.

As described above, by September 1, 2000, the Palm House and monitor structural aluminum activities had progressed sufficiently to allow Rough Brothers to begin the installation of the glazing system on the monitor. *See* A4 Supp. R00959. However, Rough Brothers discovered that the monitor was not sufficiently level to allow Rough Brothers to begin glazing, in that one corner of the monitor was approximately one inch higher than the diagonally opposite corner. A4 Supp. R00546; *see* A4 Supp. R00960.

Clark states that Rough Brothers' glazing system had a "zero" tolerance for the alignment of the glazing system, but that the alignment of the monitor was within Standard Iron's tolerances. App. PFF ¶ 1044. Clark contends that AOC was responsible for designing a system that would accommodate the difference in tolerances and that Rough Brothers' work in reconciling the tolerance differences of the two subcontractors is a change to the contract. App. PFF ¶¶ 1045, 1046.

AOC disputes Appellant's entitlement here, arguing that it was Clark's obligation under section 13123 of its Contract to provide a glazing system, including "all attachments to make its system operational and complete." AOC also contends that it was Clark's obligation under the contract to coordinate the glazing system and structural aluminum work. Resp. PFF, part 2, tab XI, at 2.

Appellant does not here dispute that section 13123 is a performance specification that placed upon Clark the obligation to design, fabricate, and install the glazing system, or that this specification required Clark to provide all necessary connections and attachments for the installation of the entire glazing system. Rather, the crux of Clark's argument is that it was AOC's, and not Clark's, responsibility to reconcile the differing tolerances employed by its

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<sup>388</sup>Clark has paid Rough Brothers for this change claim. H.Tr., Dylus, 22:180.

structural aluminum subcontractor (Standard Iron) and glazing system subcontractor (Rough Brothers). In this regard, Appellant cites *Hoffman Constr. Co.*, DOTBCA No. 2150, February 23, 1993, 93-2 BCA ¶ 25,803 at 128,424, in support of its argument that “Rough [Brothers] should not have been charged with reconciling the tolerances.” App. PFF ¶ 1046.

We first note that the *Hoffman* decision does not support Appellant’s argument that AOC was required to reconcile its subcontractors’ differing tolerances. The board in *Hoffman* merely noted that the government could not rely upon the contractor’s duty to coordinate its subcontractors’ work to escape liability for defective dimensions and tolerances provided in government-furnished, design specifications. Unlike the situation presented in *Hoffman*, Clark was performing its work under a performance specification that left to Clark the responsibility for designing the glazing system, and determining how best to install and attach it to the aluminum structure.

We also find that the record does not support Clark’s suggestion that the aluminum structure design was inadequate with respect to the tolerances required in constructing the monitor *vis-à-vis* the glazing system. As has been described above, Clark’s contract required the design, fabrication, and installation of a custom-built glazing system, including its attachment to the aluminum structure. See R4, K0897. In installing this custom glazing system on the monitor after that structure’s erection, no changes to the aluminum structure were apparently necessary; in fact, Clark does not argue that, apart of the tolerance differences presented, the monitor structure, as erected, was defective in any regard. Rather, the resolution of this problem merely required Rough Brothers to furnish a solution that would allow Rough Brothers’ custom glazing system to properly attach to the aluminum structure. We fail to see why that solution--Rough Brothers’ provision of the monitor gutter clips to allow its glazing system to be properly installed--is not simply part of the glazing system work that Rough Brothers and Clark were required to provide under section 13123 of its contract.

Clark also argues “[a]ccording to the [Manual of Steel Construction, Allowable Stress Design], the project owner, here AOC, is responsible for coordinating the specified tolerances in the contract document,” App. PFF ¶ 307, and “the owner [is] responsible for coordination of the tolerances between trade items and the structural frame.” App. Reply Brief at 12, 19, *citing* App. Exh. 116, *Manual of Steel Construction, Allowable Stress Design*, Ninth Ed., ¶ 7.11.4.

Clark’s citation to Appellant’s Exhibit 116, which is merely two pages from the Manual of Steel Construction, Allowable Stress Design, and unsupported argument regarding the impact of this manual do not establish that AOC had the contractual obligation to coordinate the tolerances required for its structural aluminum and glazing system subcontractors. This exhibit was identified and entered into evidence by Appellant without objection from the Respondent during the testimony of AOC’s scheduling expert, Mr. Heroy. H.Tr., Heroy, 25:95, 155-56. Mr. Heroy, who was not qualified as an expert in structural engineering, testified that he had seen the Manual of Steel Construction, but was not familiar with and could not testify as to the specific provision that Appellant identified in the exhibit. Despite the fact that a number of experts were qualified during the trial to offer structural engineering opinions to the Board, including Clark’s own structural engineering experts, Mssrs. O’Hanlon and Russo, the Appellant did not seek any testimony from these experts regarding this exhibit. Furthermore, Clark has provided no

argument or statements to the Board explaining why this Manual of Steel Construction necessarily governs differing tolerances between an aluminum structure and a glazing system attached to it, and none seem apparent to us from the record.

Although not provided or cited to by Clark, the Board takes notice that the Manual of Steel Construction, Allowable Stress Design, Ninth Edition, from which Clark takes its Exhibit 116, states, “[t]he information presented in this publication has been prepared in accordance with recognized engineering principles and is for general information only.” *Manual of Steel Construction, Allowable Stress Design*, Ninth Ed., at Copyright Page. However, unlike other industry standards, the provisions identified by Clark in its Exhibit 116 have not been specifically included or incorporated into the contract between Clark and AOC. Absent incorporation or inclusion in the contract, the Board finds that these provisions of the *Manual of Steel Construction, Allowable Stress Design*, reflect merely trade or industry practices, usage or custom.<sup>389</sup> See, e.g., *Sterling Millwrights, Inc. v. United States*, 26 Cl. Ct. 49, 71 (1992). Trade practices or usage cannot override unambiguous contract provisions, such as this contract’s duty to coordinate clause. See *R.B. Wright Constr. Co. v. United States*, 919 F.2d 1569, 1572-73 (Fed. Cir. 1990); *John R. Hundley, Inc.*, VABCA Nos. 3493 *et al.*, February 10, 1995, 95-1 BCA ¶ 27,494 at 137,026. As the board in *John R. Hundley, Inc.* noted with respect to the difficulties faced by various trades on a construction project fitting everything into designed spaces:

The designer represents that it will all fit, but does not detail exactly how everything is going to relate to each other. That task is left up to the prime contractor to work out with its subcontractors, via the “duty to coordinate” clause.

*John R. Hundley, Inc.*, *supra*, at 137,029.

In sum, the Board does not find that Rough Brothers’ fabrication of the monitor gutter clips in order to attach its glazing system to the monitor was a change to Clark’s contract. Rather, the Board finds that it was Clark’s contractual obligation to provide the glazing system, including its attachment to the aluminum structure, and that the provision of the gutter clips to accomplish this work was therefore Clark’s responsibility. We therefore deny Rough Brothers’ change claim.

#### **G. Corner House Finned Tube Radiation Support, Clark Change Order No. 810300**

Rough Brothers claims \$5,541 for installing the finned tube radiation supports in the Corner Houses. H.Tr., Sullivan, 8:216, 222; R4, 10464-65. Clark has paid Rough Brothers this amount. R4, 10469. This issue was resolved above in Clark Change Order No. 810401 above, where we

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<sup>389</sup> With respect to the applicability of industry standards, the contract provides that “[e]xcept to the extent that more explicit or more stringent requirements are written directly into contract documents, applicable standards of the construction industry have the same force and effect (and are made part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies were bound herein, subject to the order of precedence previously stated.” R4, K0108. As noted above, Clark does not state or provide evidence showing that its Exhibit No. 116 states an industry standard applicable to the provision of the structural aluminum and glazing system. On other hand, the contract does contain an explicit provision requiring Clark to coordinate the work of its subcontractors.

found that this work was Clark's responsibility under the contract to install the finned tube radiation system by attaching it to the building structure. Thus, we deny this change claim.

## XVI. KIRLIN'S CLAIMS

Kirlin was the mechanical and plumbing subcontractor for this project. It has filed on its own behalf claims of \$484,346 for acceleration damages and \$308,715 for delay damages.<sup>390</sup> C4 Supp. 08 0278; App. Exh. 69. In addition, Kirlin has filed a claim of \$76,132 on behalf of United Sheet Metal, its sheet metal subcontractor, that has been variously characterized as being for delay or for acceleration.<sup>391</sup> C4 Supp. 08 0287. Finally, we decide here numerous change claims in which Kirlin has the primary stake.

### **A. Acceleration Claim**

Kirlin claims \$484,346 in damages for its acceleration during the period from April 14, 2000 to March 31, 2001. C4 Supp. 08 0272-74; H.Tr., Hahr, 15:14-15. Kirlin argues that by letter dated April 14, 2000, it was directed by Clark to accelerate its scope of work for the Botanic Garden project so that all areas other than the Palm House were completed by December 30, 2000, and the Palm House by March 31, 2001. C4 Supp. 08 0275. Kirlin argues that it immediately commenced its acceleratory efforts in accordance with Clark's letter and that such accelerated performance continued through March 31, 2001. *Id.* at 0271-72. Kirlin computed its acceleration claim as follows:

Overtime Wages	\$235,780
Inefficiencies	\$187,995
<b>Subtotal</b>	<b>\$423,775</b>
Labor Burden (23%)	\$97,469
<b>Subtotal</b>	<b>\$521,244</b>
Overhead (10%)	\$52,124
Profit (10%)	\$57,337
<b>Subtotal</b>	<b>\$630,705</b>
Credit for Overtime in Change Orders	<\$146,359>
<b>Total</b>	<b>\$484,346</b>

App. Exh. 69.

Kirlin's overtime wages figure (\$235,780) represents the total amount of overtime costs that the company incurred during the time period in question. This figure is reasonably supported by

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<sup>390</sup> Clark's final revised claim fails to account for various adjustments Kirlin made to its claims during the hearing, and thus erroneously reflects that Kirlin's acceleration claim is \$577,635 and its delay claim is \$400,835. App. Exh. 139, attach. 10.

<sup>391</sup> While Clark's final revised claim shows this claim as one for delay damages, App. Exh. 139, attach. 10, as explained by Kirlin at the hearing, this is in fact a claim for acceleration damages. H.Tr., Hahr, 15:25-27.

Kirlin's labor summary report. C4 Supp. 08 0274. While DCAA's audit report questioned that portion of the overtime wages that were for Kirlin's foreman, as it found that this amount was also part of Kirlin's delay claim, DCAA Audit Report of Kirlin at 7, we believe that the foreman's overtime wages are reflective of Kirlin's acceleration efforts and should be counted here (and not in the delay claim).

Kirlin also claims labor inefficiencies to both its regular and overtime work hours totaling \$187,995. App. Exh. 69. Kirlin determined this amount by applying a 20-percent inefficiency factor to the total number of hours worked during the period in question and multiplying the product by a computed average wage rate.<sup>392</sup> Kirlin relied upon the testimony of its representative Matt Hahr and the Mechanical Contractors Association of America, Inc. (MCAA) Labor Estimating Manual, specifically the Table for Calculation of Premium Time and Inefficiency on Overtime Work, in support of its 20-percent inefficiency factor. H.Tr., Hahr, 15:15-17; App. Exh. 63.

As observed by the Court of Claims:

It is a rare case where loss of productivity can be proven by books and records; almost always it has to be proven by the opinions of expert witnesses. However, the mere expression of an estimate as to the amount of productivity loss by an expert witness with nothing to support it will not establish the fundamental fact of resultant injury nor provide a sufficient basis for making a reasonably correct approximation of damages.

*Luria Brothers & Co. v. United States*, 177 Ct. Cl. at 696; see *Sauer Inc.*, *supra*, at 155,632-33. As indicated above, the support commonly relied upon for identifying and measuring labor inefficiency is a comparison to some accepted standard. *Herman B. Taylor Constr. Co.*, *supra*, at 159,895-98; *DANAC Inc.*, *supra*, at 145,152. Where a claim of labor inefficiency is based on assumptions which are not supported by reliable empirical data, the claim of labor inefficiency will be denied for insufficient proof. *Luria Brothers & Co. v. United States*, 177 Ct.Cl. at 696.

Kirlin did not submit adequate proof of labor inefficiency here. In this regard, Mr. Hahr only testified about the work schedules and amounts of overtime that Kirlin worked during this timeframe, but provided no evidence regarding what, if any, actual inefficiencies occurred as a result of the overtime being worked. H.Tr., Hahr, 15:15-17. Moreover, while boards of contract appeals have accepted MCAA bulletins and manuals as evidence in analyzing claims for labor inefficiency, when they are explained and interpreted by expert testimony, see, e.g., *Hensel Phelps Constr. Co. v. General Services Administration*, GSBICA 14744, *et al.*, January 11, 2001, 01-1 BCA ¶ 31,249 at 154,321, we think that Mr. Hahr's lack of expertise in this area is evident

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<sup>392</sup> Total (regular and overtime) hours of 36,451 x 20% inefficiency factor times an average wage rate of \$25.79 per hour = \$187,995. C4 Supp. 08 0273-74. Kirlin computed its average wage rate here as the sum of \$685,698 in straight wages and \$254,278 in fringe benefits, and then divided the amount by 36,451 total (regular and overtime) hours to reach an average wage rate of \$25.79. *Id.* Kirlin presented no evidence as to why it used the figures that it did to determine its average wage rate here, or why this amount differs from the wage rates used in other aspects of its claim. See H.Tr., Hahr, 15:15-17.

from his inability to correctly interpret the MCAA table upon which he relied to support the claimed labor inefficiency factor.<sup>393</sup> Specifically, the MCAA table estimates a 20-percent composite overtime and inefficiency factor in connection with a work schedule of 5 days at 10 hours per day (“a 5-10 schedule”),<sup>394</sup> which would then be applied to straight time (or regular) work hours. App. Exh. 63 at 3. By contrast, Mr. Hahr offered the MCAA table as supporting a 20-percent factor for labor inefficiency alone (not together with overtime), H.Tr., Hahr, 15:16, which Kirlin in its claim then applied to both the company’s regular and overtime work hours. C4 Supp. 08 0273. Given that the MCAA table does not support the labor inefficiency factor asserted by Kirlin, the contractor has essentially provided no evidence for its claim here. In sum, while the use of labor inefficiency estimates may be accepted if supported by knowledgeable and expert testimony, Kirlin has provided neither. Thus, we deny Kirlin’s inefficiency claim.

Kirlin’s acceleration claim also includes \$97,468 for “labor burden.”<sup>395</sup> Kirlin’s labor burden amount was determined by applying a 23-percent labor burden rate to its subtotal of overtime wages and labor inefficiency costs. C4 Supp. 08 0273. Kirlin, however, provided no support for how its 23-percent labor burden rate was derived either with its claim or through the testimony of its corporate representative. *Id.*; H.Tr., Hahr, 15:13-23. By contrast, DCAA’s audit found that Kirlin’s actual average labor burden rate, based upon the company’s audited fiscal year (FY) 2000 labor burden rate and FY 2001 unaudited labor burden rates, was 14.43 percent. DCAA Report of Kirlin at 9. Kirlin did not challenge or rebut DCAA’s findings here, or offer any testimony why the 23-percent figure was more accurate. Accordingly, we accept the 14.43-percent labor burden rate as appropriate here.

As set forth above, Kirlin’s acceleration claim “backs out” the overtime amounts that are part of specific change order claims also pursued by the company totaling \$146,359.<sup>396</sup> App. Exh. 69; C4 Supp. 08 0273; H.Tr., Hahr, 15:18-20. We know of no reason, however, why this amount was not deducted “above the line” (*i.e.*, before the overhead and profit markups were applied),

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<sup>393</sup> While Mr. Hahr was accepted by the Board as an expert in piping and piping pricing, H.Tr., 6:131, he was not accepted as an expert in inefficiency claims.

<sup>394</sup> Mr. Hahr testified that while the company had put its workforce on a six 10-hour work week (a 6-10 schedule), not all crafts were actually working that amount, but that everyone was working at least a 5-10 schedule. H.Tr., Hahr, 15:16. As a result, Kirlin considered it appropriate to utilize the inefficiency rate associated with a 5-10 work schedule as part of its acceleration claim. *Id.* at 15:16-17.

<sup>395</sup> As part of its audit, DCAA determined that Kirlin’s accounting system automatically applied a labor burden rate to wage labor, and that this category was intended to cover costs related to taxes, insurance, fabrication facility and trucking. DCAA Report of Kirlin, May 6, 2003, at 18. DCAA also reported that the subcontractor does not monitor or review the rate regularly, *id.*, a finding that Kirlin has not challenged.

<sup>396</sup> While the DCAA audit states that the amount of overtime wages included in Kirlin’s change order proposals (other than the \$93,289 for the fogging system change order) totals \$55,466, DCAA Audit of Kirlin at 7, DCAA’s audit provides no explanation or support for this amount. Accordingly, we accept Kirlin’s figures here, as the company has detailed the specific change order proposals that include overtime wages for the same time period. C4 Supp. 08 0273; App. Exhs. 64, 69.

instead of afterwards, as to do otherwise essentially results in claiming the markups on these amounts twice--here and in the change order claims.

Kirlin also seeks overhead and profit markups of 10 percent each, which it applies to its total acceleration costs. C4 Supp. 08 0273. We find these rates to be consistent with the applicable contract provisions and therefore allowable. R4, K0188.

Based on the foregoing, we find that the amount of acceleration damages shown by Kirlin was \$149,367, calculated as follows:

Overtime Wages	\$235,780
Inefficiencies	0
Labor Burden (14.43%)	\$34,023
Credit for Overtime in Change Orders	<\$146,359>
Overhead (10%)	\$12,344
Profit (10%)	\$13,579
<b>Total</b>	<b>\$149,367</b>

As detailed above, the only period of government-ordered constructive acceleration under this contract that would be applicable to Kirlin's work was that subsequent to February 5, 2001, when AOC issued its cure notice to Clark. Mr. Hahr testified that Kirlin's acceleration claim documentation applied to the entire period claimed (April 14, 2000 to March 31, 2001) and that Kirlin does not break out the overtime amounts by time period. H.Tr., Hahr, 15:35.

Accordingly, in the absence of other evidence, we will apply a straight percentage of the number of days in the period for which acceleration is recoverable (February 6 to March 31, 2001, or 54 days) to the total number of days in the period for which Kirlin has computed its acceleration costs (April 14, 2000 to March 31, 2001, or 352 days) to determine the percentage of Kirlin's acceleration costs that are potentially recoverable here. Based on the foregoing, we find that Kirlin incurred \$22,914 in acceleration damages after February 5, 2001.<sup>397</sup>

However, as discussed above, the government is not liable for all the acceleration damages incurred after February 5 because the acceleration flowed from concurrently caused delay. We can apportion the allowable acceleration damages attributable to the excusable delay portion of the total contract delay, and find that Kirlin is entitled to recover 122.4/421 of the \$22,914 in otherwise allowable acceleration damages, that is, \$6,662.

### **B. Delay Claim**

Kirlin also claims \$308,715 in delay damages for extended job performance assertedly caused by the government. C4 Supp. 08 0278. Specifically, Kirlin argues that as the plumbing and mechanical contractor it worked on the Botanic Garden project for its entire duration. *Id.* Kirlin alleges that while the approved schedule called for the project to be completed by September 5, 2000 (representing 997 calendar days of performance from the date of its December 8, 1998

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<sup>397</sup>  $54/352 \times \$149,367 = \$22,914.$

subcontract),<sup>398</sup> project delays beyond Kirlin's control and not due to Kirlin's fault caused its actual completion to be delayed until August 31, 2001 (a 360-calendar day delay). *Id.* Kirlin contends that it suffered a "day-for-day" delay or extension with the overall project delay and has filed an "extended general conditions" delay claim.<sup>399</sup> *Id.* Kirlin's delay claim is for \$308,715, computed as follows:

Daily Rate	\$735.11
Days Extended	x 360
Subtotal	\$264,640
Overhead (5%)	\$13,232
Markup (10%)	\$27,787
Bond (1%)	\$3,056
<b>Total</b>	<b>\$308,715</b>

*Id.* at 0278. Kirlin's \$735.11 daily rate was determined by totaling its time sensitive general conditions costs (e.g., foreman, trailers, equipment rented) for the entire Botanic Garden project, \$768,093,<sup>400</sup> and subtracting out those general conditions costs in approved change orders, \$35,190, and dividing the net by the 997 calendar day performance period. *Id.* at 0277-79.

In its audit, DCAA questioned portions of the costs that make up Kirlin's daily rate as representing costs incurred beyond the subcontractor's completion date. Specifically, DCAA found a total of \$28,125 of Kirlin's general conditions costs were incurred after the August 31, 2001 substantial completion date. DCAA Audit of Kirlin at 12-15. In this regard, the job cost summary upon which Kirlin relies to support its costs in the aforementioned general conditions categories accumulates the subcontractor's expenses through February 22, 2002. C4 Supp. 08 0280. Kirlin offered no evidence or testimony rebutting DCAA's findings. *See* H.Tr., Hahr, 15:24-25. We therefore accept DCAA's findings in this regard and reduce Kirlin's claimed general conditions daily rate accordingly.

Kirlin's daily rate also includes its project foreman costs. C4 Supp. 08 0279. As noted above, DCAA determined that \$68,043 of the foreman wages in Kirlin's delay claim were also included as overtime wages in Kirlin's acceleration claim. DCAA Audit of Kirlin at 7. Since we find that amount was properly included in the acceleration claim and not the delay claim, we remove these costs from Kirlin's daily rate here.

<sup>398</sup> We find that the 997 calendar days in fact represents the number of calendar days between the date of Kirlin's subcontract agreement of December 8, 1998 and its August 31, 2001 completion date.

<sup>399</sup> The nature of an extended general conditions delay claim is described above with regard to Clark's delay claim.

<sup>400</sup> Kirlin's daily rate includes project manager (a/k/a "job office personnel") expenses, which the subcontractor claims as a direct cost. As part of its audit, DCAA determined that Kirlin's project management labor was allocated to jobs directly based on a percentage the employee estimated he or she spent working on each job during a given month, DCAA Audit of Kirlin at 18, and we note that this was how Kirlin priced its change proposals. DCAA did not take exception to aspect of Kirlin's claim.

As indicated above, DCAA also found that Kirlin's foreman costs were computed using a 23-percent fringe burden rate, although the company's actual average labor burden rate was 14.43 percent. *Id.* at 12-13. Again, we note that Kirlin took no exception to the DCAA findings. *See* H.Tr., Hahr, 15:24-25. Accordingly we accept DCAA's adjustment of \$24,516.<sup>401</sup>

Kirlin's claim as submitted also provided for a credit of \$35,190 for general conditions costs in approved change orders. C4 Supp. 08 0279. On April 30, 2004, Kirlin informed the Board that its total cost pool for extended general conditions should be reduced by an additional \$21,565 as a result of further change order settlements achieved during the hearing. Kirlin Letter, April 30, 2004, at 1. Kirlin also represented that to the extent the Board made award to Clark for any of Kirlin's additional general conditions items in pending change order claims, a credit in the same amount should be taken from Kirlin's total general conditions costs here, so we have adjusted Kirlin's daily rate to account for these costs as well. *Id.*

Based upon the foregoing adjustments, we compute Kirlin's extended general conditions daily rate as follows:<sup>402</sup>

Total General Conditions Costs	\$768,093
Approved Change Orders (11/1/02)	<\$35,190>
Change Order Settlements (4/30/04)	<\$21,565>
Costs Beyond 8/31/01	<\$28,125>
Foreman Acceleration	<\$68,043>
Foreman Fringe Rate Adjustment	<\$24,516>
Change Orders Allowed in Appeal	<\$208,706> <sup>403</sup>
<b>Net Total</b>	<b>\$381,948</b>
<b>Daily Rate Calculation:</b>	
Revised Daily Rate (997 days)	\$383.10 <sup>404</sup>
Days Extended	x 360

<sup>401</sup> DCAA questioned a total of \$24,516 of Kirlin's foreman costs as a result of the difference in fringe rates (\$24.59 in foreman average daily costs questioned x 997 = \$24,516). DCAA Audit of Kirlin at 12.

<sup>402</sup> The claimed bond costs are disallowed as they are considered part of the overhead allowance, R4, K0189, and they are otherwise not supported by any evidence.

<sup>403</sup> Kirlin provided an exhibit to assist the Board in determining the amount of general conditions costs included in change claims that were the subject of this appeal. Kirlin Letter to Board, April 30, 2004, exh. 1. Based on our review, we find the following general conditions costs in Kirlin's change claims were included in the amounts that we found recoverable in this decision: Clark Change Order No. 810214--\$82,584, No. 810040--\$119,564, No. 810324--\$3,421, No. 810111--\$1,254, No. 810400--\$1,465, No. 810094--\$290, and No. 810346--\$128 = \$208,706.

<sup>404</sup> \$381,948/997 = \$383.10

<b>Subtotal</b>	<b>\$137,916</b>
Overhead (5%)	\$6,896
Markup (10%)	\$14,481
<b>Total</b>	<b>\$159,293</b>

As indicated above, there were concurrent causes for the 360 days of contract delay. However, we are able to apportion the amount of compensable delay for which AOC was responsible and find that Kirlin may recover 120.4/421 of its \$159,293 in delay damages, or \$45,556.

### C. United Sheet Metal Acceleration Claim

Kirlin, on behalf of its subcontractor United Sheet Metal, claims acceleration damages in the amount of \$92,120; this consists of \$76,132 for United Sheet Metal, plus Kirlin's 10-percent overhead and profit markups. C4 Supp. 08 0270, 0287; H.Tr., Hahr, 15:25-27. United Sheet Metal performed ductwork installation on the Botanic Garden renovation contract for Kirlin. *Id.* at 15:25. United Sheet Metal alleges that as a result of a March 29, 2001 directive from Clark, through Kirlin, it was required to work overtime to prosecute its scope of work on the Palm House. C4 Supp. 08 0291-92. United Sheet Metal contends that it then accelerated its work, which caused the subcontractor to incur additional overtime, impact to field productivity, and additional supervision costs. *Id.* at 0288. United Sheet Metal's claim was presented as follows:

Premium Portion (245 hrs @ \$20.15/hour)	\$4,937
Field Labor Impact to Production (1,018 hrs @ 40.29/hour)	\$41,015
Additional Supervision (159 hrs @ \$57.11/hour)	\$9,104
<b>Subtotal</b>	<b>\$55,056</b>
Overhead (25.71%)	\$14,155
Profit (10%)	\$6,921
<b>Total</b>	<b>\$76,132</b>

*Id.* at 0289.

United Sheet Metal provided no documentation in support of its claim other than a signed affidavit affirming its entitlement for the amounts claimed. *Id.* at 0288. In support of this claim, Mr. Hahr, Kirlin's representative, testified that he had discussed the claim with United Sheet Metal's president, and that he believed the claimed costs were fair and reasonable. H.Tr., Hahr, 15:27, 37-38.

We find the evidence regarding United Sheet Metal's acceleration claim to be insufficient to permit recovery. First, Appellant presented no evidence regarding when United Sheet Metal incurred the costs it claims, other than it was subsequent to the Clark March 29, 2001 directive that it accelerate its performance. United Sheet Metal has also failed to provide any supporting data for how it determined the rates and hours it claims. Significantly, Kirlin's representative testified that United Sheet Metal had actual cost records for its claim, H.Tr., Hahr, 15:37-38; thus, we know of no reason why the contractor was then either unwilling or unable to proffer any

evidence whatsoever concerning the actual costs it incurred for its acceleration. Further, while Kirlin's representative stated that United Sheet Metal's claim appeared fair and reasonable because the time frame in which United Sheet Metal's performance was accelerated was the same as that for Kirlin, Kirlin's acceleration actually occurred from April 14, 2000 to March 31, 2001, C4 Supp. 08 0271-72, whereas United Sheet Metal's acceleration claim occurred subsequent to the March 29, 2001 acceleration directive (which it did not receive until April 4, 2001). *Id.* at 0291. Lastly, although Lawrence Smith, United Sheet Metal's president, testified at the hearing about other aspects of the appeal, he offered no testimony regarding the company's acceleration claim. In sum, Kirlin has not met its burden here of proving either the fact or amount of loss with sufficient certainty, and we deny the claim.

#### **D. Kirlin Change Claims**

Kirlin has submitted numerous change claims, virtually all of which are supported by estimates rather than actual costs. AOC argues that since Kirlin has made no effort to support its claims by evidence of actual costs, we should not allow Kirlin any additional costs for these claims.

As noted above, where actual cost data is not available, estimates of the contractor's costs may be used. Cost estimates should be prepared by competent individuals with adequate knowledge of the facts and circumstances, and be supported with detailed substantiating data. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321.

Here, Mr. Hahr testified that Kirlin is a union contractor subject to a collective bargaining agreement, and indicated that the craftsman it employs on a project are not assigned by the foreman based on whether work was basic contract work or change order work and that the work done by these employees is not segregable.<sup>405</sup> H.Tr., Hahr, 6:27-28, 31-32. He testified in detail as to why Kirlin is unable to track its actual costs for changes:

Basically changes occur, like I said before, when you're trying to build a main job that you're contracted to do. You're in the process of installing other work, whether it be other change work or original contract work. And a change is made. You've got people out there installing pipe and to administer a change, if you want to get into a segregation of cost process to explain to the foreman and the guys in the field that that, for example, this 10 feet of pipe is base contract so it's got to coated (sic) this way. The next two feet might be change and then that valve has changed and then you continue back on contract work. It's basically two things. It's an administrative nightmare and the reality is it ain't going to be correct. The guys are not going to track it that close. And the only other way, if you were to take and set up a separate crew change order, the cost would be phenomenal because you end up having to do work that had to be taken out.

*Id.* at 6:31-32.

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<sup>405</sup> Mr. Hahr has considerable experience in the plumbing and mechanical industry and was accepted by the Board as an expert in piping and piping pricing. H.Tr., Hahr, 6:18-29, 131.

The guys in the field are focusing on getting the job built. They don't really care whether the pipes they're putting in are change or base. They're trying to get it in the most productive manner.

*Id.* at 6:221.

... we cannot segregate change order labor from base cost labor. This is a good change to look at as an example. My change condition was the lowering the pipe in the production, the additional production rate that would have--that it did take me to install the pipe at that deep elevation. But also within that I had base contract work installing the exact same pipe, so the guys that are doing the work and the foreman that are tracking the time it's impossible for them to say, okay, for the first two hours and 15 minutes we're going to be installing basic contract pipe and the next five hours and 45 minutes is change order work. It's impossible for them to do that. Even if they made the attempt to do that there would no basis of--you couldn't tell if it was right or wrong because it would be a guess. So, we don't segregate change order work by change order because it's just impossible to do notwithstanding the additional administrative costs that would be rendered too high.

*Id.* at 15:159-60.

Mr. Hahr also testified that, for basically the same reasons, Kirlin was unable to segregate material costs for particular change orders from basic contract work. *Id.* at 6:32-35. In this regard, Mr. Hahr explained that its plumbing and mechanical material is generally purchased in bulk, not for a particular contract, and stored in its storage facility in Rockville, Maryland, and the material is pulled out as needed for particular jobs. *Id.* at 6:33. The record otherwise indicates that the material for changed work for the plumbing and mechanical work on this project was essentially the same type as for the base contract work.

AOC has provided no evidence that contradicts Mr. Hahr's testimony. Based on our review, we find that Kirlin has sufficiently demonstrated that actual cost data is unavailable to support its change claims involving labor and material, and that it could support its change requests by adequately supported estimates.

Kirlin estimated its change claims based upon the MCAA Manual for its labor costs and the Harris National Mechanical Estimator for its material costs. *Id.* at 6:37, 9:112; 10:177. Kirlin also used the MCAA Manual in pricing its proposal for the project. *Id.* at 6:172. The MCAA Manual is a labor estimating guide commonly used in the plumbing and mechanical contracting industry, *id.* at 6:37, and is an accepted source, in appropriate circumstances, for estimating labor amounts in plumbing and mechanical work to determine the amount of damages due in an equitable adjustment. See *Clark Concrete Contractors, Inc.*, VABCA No. 14340, March 15, 1999, 99-1 BCA ¶ 30,280 at 149,760. The Harris National Mechanical Estimator is also commonly used in the industry. See H.Tr., Hahr, 10:164; Sinclair, 26:111-12.

Kirlin's estimates for changed work are based upon "takeoffs," that is, analyses of the contract and change drawings by qualified estimators who determine all of the material components of the change (*i.e.*, pipe, fittings, hangers, valves, joints, sleeves, etc.). H.Tr., Hahr, 6:33-35. With the MCAA Manual, the material components in the change, as determined from a takeoff, are used to determine "labor units," that is, time measures of how long it takes to install the particular component, as designated in the MCAA Manual. *Id.* at 6:37-38, 73-75. These labor units are then multiplied by the appropriate component quantity to estimate how many craftsman hours that it will take to install each component, and these amounts are totaled to determine the total craftsman hours necessary to accomplish the change.<sup>406</sup> *Id.* at 6:38-39, 44.

AOC claims that estimates based on the MCAA Manual are excessive because all components that are used in the change, no matter how minor, are considered in pricing the changed work, *id.* at 6:37-38, and that the R.J. Means Cost Estimating Guide, another well-recognized estimating manual, which does not consider all components in estimating labor but only major components (such as pipe), will produce more accurate estimates. *See* H.Tr., Murphy, 6:143-44. However, AOC has produced no evidence or expert testimony that indicates that use of the MCAA Manual will not produce accurate labor estimates for changed work or that the use of the Means Guide is a more reliable method for estimating plumbing/mechanical costs.<sup>407</sup> Moreover, Mr. Hahr (an expert in piping pricing) testified that he is familiar with, and has used the Means Guide (used by AOC/DMJM in preparing change estimates), and believes (and provides cogent reasons for this belief) that some of AOC's estimates for changed work are based upon a misapplication of that guide. *See* H.Tr., Hahr, 6:69, 71-72, 82, 218-20. AOC has produced no persuasive rebuttal to Mr. Hahr's testimony.

AOC also notes that the MCAA Manual rates are based upon journeymen production and Kirlin employed mixed crews of journeymen and apprentices on this project. *Id.* at 6:39-40, 166-67. AOC contends that the MCAA Manual is therefore not a valid basis for estimating labor units for this project. Resp. PFF, part 4, tab 2, at 4. However, as indicated by Mr. Hahr (and which is otherwise obvious), the production rates of journeymen are higher than for apprentices. H.Tr., Hahr, 6:39-40. This suggests that Kirlin's estimate could be said to actually understate the "labor units" needed to install the particular components determined by the takeoff, and that its cost estimate for the changed work would be more if the lesser production of apprentices were considered in determining the labor unit. Since this aspect of using the MCAA Manual is theoretically only to Kirlin's disadvantage, we find that Kirlin can use the MCAA Manual to determine its estimated labor in its change requests.

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<sup>406</sup> The MCAA Manual also contains other factors that may affect the labor hours relating to such matters as difficulty of the work. H.Tr., Hahr, 6:214-15.

<sup>407</sup> Two Respondent witnesses, Msrs. Murphy and Sinclair, who were qualified to give expert opinions on this subject, testified on behalf of AOC, but neither testified that the proper use of the MCAA Manual would not lead to reliable estimates for changed work. Mr. Coffey of DMJM, who prepared AOC estimates for many of the changes, opined that estimates based upon the Means Guide would be more accurate than the MCAA Manual, but admitted that he was not familiar with the MCAA Manual. H.Tr., Coffey, 7:84-85, 94.

The craftsman labor rates used in Kirlin's change claims are for journeymen, even though Kirlin employed mixed crews of journeymen and apprentices. H.Tr., Hahr, 6:39-40, 86. While Mr. Heroy did not testify at the hearing concerning Kirlin's change claims, he prepared an estimate for Clark Change Order No. 810040 (P100 Revisions) (discussed below), which was made part of this record.<sup>408</sup> R4, COF 1158-81. In this report, Mr. Heroy noted the apparent overstatement in Kirlin's craftsman's rate because it was based on the journeymen's labor rates and did not account for the apprentice's lower labor rates. He reviewed a sampling of Kirlin's payrolls to calculate a weighted average calculation of crew labor rates based on Kirlin's actual employment of journeymen and apprentices on its crews. R4, COF 1170. Based on his analysis, he found the craftsman's labor costs were overstated by 10 percent. *Id.* Kirlin has offered no evidence or explanation as to why its craftsman labor rates could or should not be blended to more accurately account for its actual labor rates to account for the use of apprentices in estimating its change claims, and we find Mr. Heroy's fact-based analysis of this issue to be persuasive. Thus, in resolving Kirlin change claims below, we will downwardly adjust Kirlin's otherwise allowable craftsman labor costs by 10 percent.

AOC has also not shown that Kirlin's use of the Harris National Mechanical Estimator to estimate material costs for this project will produce unreliable estimates for changed work. In this regard, Mr Hahr testified that the guide used is updated monthly to ensure accurate pricing. *Id.* at 6:179-81. Moreover, AOC has produced no evidence or expert testimony that would indicate that the use of this guide will not result in accurate material estimates for changed work and in fact this guide was one of the material estimates sources used by AOC's estimating expert. *See* H.Tr., Sinclair, 26:111-12.

Kirlin's typical estimate in support of a change request does not end with the claimed craftsman labor costs and material costs. Kirlin's claims also includes costs for additional labor hours, based upon fixed percentages of craftsman's hours, for "unproductive" foreman hours, quality control hours, and safety hours, as well as equipment and subcontract costs. Finally, Kirlin's estimates typically include: (1) costs for drayage, warranty and "start up and punch" of equipment and/or materials, calculated as a percentage of the equipment or material costs; (2) rental/tool costs for Kirlin-owned equipment used on the change, charged at Kirlin's internal rates for the estimated duration of the change; (3) drafting/coordination costs for a coordinator and other members of the coordination department and associated drafting equipment costs, calculated based upon a percentage of the total labor hours; and (4) "other" or "management" costs associated with the change, such as estimating the work, submittal processing and review,

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<sup>408</sup> While Mr. Heroy was not accepted by the Board as an expert in cost estimating, Mr. Heroy's testimony at the hearing indicated that he had considerable experience in the cost analysis of claims and had been previously accepted by a court as an expert in this area. H.Tr., Heroy, 23:19-25. Given his experience and knowledge in estimating change claims and Clark's failure to object to the Board's consideration of Mr. Heroy's estimate and offer of evidence to rebut this estimate, H.Tr., Hahr, 14:206-07, we credit those opinions of Mr. Heroy expressed in his estimate that are consistent with the record.<sup>409</sup> Frank Murphy of DMJM testified that the resolution of this issue with the low pressure system might have resulted in delay to the project. H.Tr., Murphy, 25:271. We need not assign fault for Kirlin's inability to provide a fully compliant low pressure system because a change was made by AOC and all that is at issue here is Kirlin's entitlement to its claimed costs for this change.

work inspection, and coordination of the trades and with the general contractor, for which the estimated time of the senior project manager, project manager, estimator/engineer and foreman are estimated. We resolve the general allowability of these typical elements of Kirlin's change claims in Clark Change Order No. 810214 (Revised Fogging System) below. These resolutions will be applicable to the other Kirlin change requests that we decide.

## **E. Revised Fogging System, Clark Change Order No. 810214**

### **1. Background**

The fogging system transmits water, which has been purified through a reverse osmosis process, throughout the Botanic Garden facility, to nozzles where a fog or vapor is created to water the plants and control the temperature. *See* H.Tr., Hahr, 14:214, 217-18. As initially issued, the solicitation for the renovation of the Botanic Garden specified a high pressure fogging system, and the offerors' initial proposals included a separate price for this item. Clark's submitted price for this item was \$190,000. COD, Revised Fogging System Claim.

During the procurement process, AOC decided to instead specify a low pressure fogging system, and amended the solicitation in amendment No. 9 to delete the requirement for the high pressure system and to request a separate price for a specified low pressure system. R4, K1758. Clark's contract price for this item was \$480,000. R4, K1544. Kirlin agreed to provide and install the fogging system under its subcontract with Clark for \$392,000. R4, 8573.

During the course of the contract, various problems arose with Kirlin's procurement of the low pressure system; specifically, the system vendor declined to provide the required 5-year warranty because of the specified nozzles in the system. R4, COF 0469; *see* H.Tr., Murphy, 25:271.<sup>409</sup> It was also determined that the low pressure system did not optimally meet the Botanic Garden's operational requirements because it did not have the capacity to fog all zones of the facility at once, a feature that the Botanic Garden staff indicated may be a requirement. R4, COF 0469; *see* H.Tr., Murphy, 25:290-91. AOC also believed that there should be significant cost savings because high pressure systems typically cost \$200,000 less than low pressure systems. R4, COF 0395. Based on the foregoing, on June 1, 2000, AOC decided to issue a change order to the contract to substitute a high pressure system for the specified low pressure system. R4, COF 0469.

Previously, Kirlin and its equipment subcontractor, Unicon Services, Inc., had made submittals and started installation of the low pressure system. H.Tr., Hahr, 14:226-27; H.Tr., Murphy, 25:299-300. However, on May 17, 2000, AOC directed Clark to stop work in procuring the low pressure system because the change to a high pressure system was going to be made. R4, 8710; H.Tr., Hahr, 15:40-41.

On June 2, 2000, AOC issued Change Order No. 105 to the contract to provide a high pressure fogging system on a design-build basis, in lieu of the specified low pressure system, and requested that Clark provide a "complete proposal" for this change by July 3. R4, COF 0467. Clark/Kirlin did not provide a proposal until July 14, in which Kirlin estimated that, accounting for the credit due from the deletion of low pressure system, its price for this change would be

\$530,372.<sup>410</sup> R4, COF 0649. After a meeting on August 4 with AOC, where this change was discussed and it was indicated by AOC that “depending on the pricing of the high pressure system, [AOC] might consider going back to low pressure, or deleting the system altogether,” R4, 8550, on August 8, AOC directed commencement of the installation of the high pressure system.<sup>411</sup> R4, 8685; H.Tr., Hahr, 14:233. Kirlin then began its procurement and installation of the high pressure fogging system.

During the course of this installation, on December 22, 2000, Kirlin submitted a final cost proposal of \$641,003 for this change. R4, COF 0565; H.Tr., Hahr, 14:234. On April 3, 2001, Clark submitted to AOC a claim in the amount of \$736,367 on behalf of itself and Kirlin, Judd and Truland for the revised fogging systems as follows:

Kirlin	\$641,003
Judd	\$20,047
Truland	\$7,848
Clark self performed	\$527
Subtotal	\$669,425
Clark 10% markup <sup>412</sup>	\$66,942
<b>Total</b>	<b>\$736,367</b>

R4, 8485-86.

In response to this claim, AOC determined that the change in fogging systems not only should not have increased the value of the contract, but this change should have resulted in a \$145,000 credit to the government. R4, 8484. Thus, AOC reduced Clark’s contract by this amount. *Id.*

In this appeal, Appellant claims \$736,367 for the revised fogging system and has requested the refund of the \$145,000 previously taken as a credit by AOC under the contract. Thus, the amount that is at issue in this appeal is \$881,367.<sup>413</sup> R4, 8480.

<sup>410</sup> The parties have made much of the lateness of Kirlin’s proposal and the asserted unreasonableness in AOC wanting a proposal in so short a timeframe. All of this is irrelevant to Kirlin’s entitlement to its costs under this change.

<sup>411</sup> Clark suggests that AOC may have been acting in bad faith in directing this work to proceed without apprising Clark/Kirlin that it believed a credit was due AOC rather than the \$530,372 requested by Kirlin. Mr. Hahr testified that no one from AOC advised him of AOC’s position at that time, H.Tr., Hahr, 14:233, while Mr. Murphy testified that he had previously advised Mr. Sullivan of Clark that a credit was expected for this change. H.Tr., Murphy, 25:313-14. This argument is also irrelevant to Kirlin’s entitlement to its costs under this change.

<sup>412</sup> As noted, in resolving most claims in this appeal, we do not address Clark’s 10-percent markup as part of the change, but add it after the total claims are accumulated. Here, for reasons that will become apparent, it is necessary to include the Clark markup in our analysis of this change.

<sup>413</sup> While the contracting officer’s decision on Clark’s claim reduced the credit asserted due AOC by \$75,000, no payments have been made based on the decision. COD, Revised Fogging System; H.Tr.,

## 2. Kirlin Claim

During negotiations regarding this claim, Kirlin broke down its claim for this change into 16 elements as follows:

a. Low Pressure System Credit	<\$392,000>
b. MEE Industries Inc. (Equipment Only)	\$137,724
c. Upgrade Reverse Osmosis System (Equipment Only)	\$23,630
d. Kirlin's Low Pressure System Work	\$28,976
e. Unicon's Costs for Low Pressure System	\$21,447
f. Unicon's Costs for High Pressure System	\$18,854
g. Labor for High Pressure Equipment Installation	\$66,646
h. Labor for Reverse Osmosis Equipment Installation	\$10,142
i. Labor for High pressure Piping and Accessories	\$438,810
j. Material for High Pressure Piping and Accessories	\$27,425
k. Rental Equipment/Tools	\$14,326
l. Coordination/Drafting	\$59,024
m. Management/Other	\$17,731
n. Added Balance Work	\$33,000
o. Miscellaneous Other Costs	\$24,019
p. Overhead and Profit	\$111,248
<b>Total</b>	<b>\$641,002</b>

R4, COF 0627;<sup>414</sup> H.Tr., Hahr, 14:235. We will consider in turn each of the 16 elements of Kirlin's claim. In so doing, we will resolve the allowability of various elements of Kirlin's change claim that will be also applicable to the other Kirlin change claims.

AOC had several estimates prepared to evaluate Clark's and Kirlin's claim. Mr. Coffey of DMJM prepared an estimate that was used by AOC in determining that it was due a \$145,000 credit. R4, 8484, COF 0400-01. In addition, Clark's and Kirlin's claims were evaluated by

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Hahr, 14:250-51. For ease of discussing this claim, we consider the claim before us as \$881,367 and do not consider the reduction of the credit made in the contracting officer's decision.

<sup>414</sup> The breakdown shown above was prepared by Kirlin to assist in negotiations and is not identical to the manner in which it detailed its costs in its change claim, although the total claimed amount is essentially the same (the \$1 difference is caused by rounding, H.Tr., Hahr, 14:239). On the cited document used in negotiations, Kirlin actually reversed the titles and amounts on its claimed Unicon costs; what are listed on the table here are the correct titles for these costs. *Id.* at 15:172-73. Moreover, in the cited document, Kirlin actually combined the material and labor costs for the installation of the high pressure piping and accessories, but we have separated labor from material, based on what we can discern from Kirlin's claim, and made this material a separate category.

Mr. Sinclair of DMS International Inc.,<sup>415</sup> who ultimately estimated that AOC was entitled to a \$3,339 credit for this change.<sup>416</sup> Resp. Exh. 66 at 11-12.

a. Low Pressure System Credit

Although Kirlin's price for the low pressure system was \$392,000, R4, 8573, AOC's credit for this system should be \$480,000, as bid by Clark,<sup>417</sup> R4, K1544, because AOC's contract is with Clark, not Kirlin. Thus, after resolving Clark's total claim for this change, AOC will be credited \$480,000.

b. MEE Equipment

Kirlin paid \$137,724 to MEE Industries, Inc., Kirlin's subcontractor/supplier of the high pressure system. R4, COF 0347, 0628; H.Tr., Hahr, 15:64. While Kirlin initially selected another subcontractor, it was directed by AOC to purchase MEE's system. H.Tr., Hahr, 14:233. Mr. Sinclair did not take exception to this element of Kirlin's claimed costs, which were supported by a "material supplier agreement" to furnish the high pressure system. See R4, COF 0347; Resp. Exh. 66 at 18; H.Tr., Sinclair, 26:130, 155. We find Kirlin should recover \$137,724 for this element of its change claim.

c. Upgrade Reverse Osmosis System (Equipment Only)

During the hearing, Mr. Hahr recalled that during negotiations it was determined that the upgrade of the reverse osmosis system would not be done and he therefore withdrew Kirlin's claim for this element, which totals \$23,630. See H.Tr., Hahr, 15:8-10, 56-57; R4, COF 0346.

d. Kirlin's Low Pressure System Work

Here, Kirlin claimed \$28,976 for the work that it had already performed on installing the low pressure system before it was ordered to stop work. A4, COF 0627. This element of the claim has five aspects:

Labor	\$6,487
Material	\$919
Foreman's extra time for assisting on resolving issue for AOC	\$11,121

<sup>415</sup> As indicated above, Mr. Sinclair was accepted by the board as an expert in construction cost estimating, including claims analysis. H.Tr., Sinclair, 26:96-97.

<sup>416</sup> Mr. Sinclair also prepared an earlier "draft" evaluation of Clark's claim, which estimated that Clark was due \$142,554 for this claim. Resp. Exh. 66 at 18. While Appellant makes much of the fact that these two estimates are different, Mr. Sinclair explained that this first estimate was a draft and he gathered further information after preparing the draft on which basis he refined his estimate. H.Tr., Sinclair, 26:151.

<sup>417</sup> None of the parties suggest that \$480,000 was an unreasonable price for the low pressure system work.

Project Manager's extra time spent on proposal	\$4,449
Senior Project Manager's extra time spent on issue	\$6,000

R4, COF 0637.

Kirlin had just begun the physical installation of the low pressure system when it was advised of the switch to the high pressure system. H.Tr., Hahr, 14:226-27. There is no dispute regarding the allowability of the labor and material costs for this physical installation of the low pressure system, which total \$7,406. Resp. Exh. 66 at 25. The other costs were for the "considerable work" and "extra costs and time that we had spent trying to sort out all the issues associated with the low pressure system," for which Kirlin claims a total of \$21,570. H.Tr., Hahr, 14:236; 15:86. AOC does not substantively respond to this aspect of the claim.<sup>418</sup> Since the claimed costs appear reasonable, we find Kirlin entitled to recover the claimed \$28,976 for this element of the change claim.<sup>419</sup> See *Bell v. United States*, 186 Ct. Cl. 189, 202-04, 404 F.2d 975 (1968).

e. Unicon's Low Pressure System Costs

Kirlin claims \$21,447 for costs incurred by its subcontractor Unicon for its costs associated with the low pressure system before the decision was made to switch to a high pressure system. These costs are primarily for submittals for the low pressure system, R4, COF 0644, which Mr. Hahr testified was a long drawn out process. H.Tr., Hahr, 14:226, 15:72. Mr. Sinclair does not take issue with this element of cost and we find it recoverable. Resp. Exh. 66 at 25.

f. Unicon's High Pressure System Costs

Kirlin claims \$18,854 for costs incurred by Unicon for the high pressure system. Mr. Hahr testified that when Kirlin was first ordered to switch to a high pressure system, it contracted in July 2000 with Unicon based upon the results of a competition among three vendors that indicated that Unicon offered the lowest price. H.Tr., Hahr, 15:171-72. Subsequently, AOC directed Kirlin to use MEE as the supplier of the high pressure system, but by this time Unicon had incurred costs totaling \$18,854. H.Tr., Hahr, 14:233-34; 15:171-72; R4, COF 0644. Mr. Sinclair disputed these costs. Resp. Exh. 66 at 18; H.Tr., Sinclair, 26:132, 157-58. However, when cross-examined at the hearing as to why he had this view, he was unable to

<sup>418</sup> In his analysis, Mr. Sinclair found that only \$10,000 should be paid for this part of the claim, although he testified, "[w]e could have said zero, but we didn't" because "we understand this was a change that was fairly complex in initiating and tying down." Resp. Exh. 66 at 25; H.Tr., Sinclair, 26:132-33. We do not credit Mr. Sinclair's testimony because he apparently did not understand that the claimed costs only related to the aborted installation of the low pressure system, but believed that they represented "project management or coordination with regards to this change." H.Tr., Sinclair, 26:139.

<sup>419</sup> It could be argued that this and some of the other low pressure system costs should more properly be offset against the \$480,000 credit due AOC instead of including these costs among the elements which we find recoverable by Kirlin. However, from a mathematical standpoint, it makes no difference here whether they are combined with the high pressure costs, as we have done here, because the same Kirlin and Clark markups, as are applicable to the allowable high pressure costs, are also applicable to the allowable low pressure costs. See H.Tr., Hahr, 14:236.

explain why they should not be allowed, except to say that Mr. Coffey of DMJM advised that these costs were not applicable to this change.<sup>420</sup> H.Tr., Sinclair, 26:157-58. We thus give no weight to Mr. Sinclair's views on this element of cost, and find that Kirlin is entitled to recover \$18,854 for this element.

g., h., i. Labor for High Pressure Equipment Installation, Reverse Osmosis  
Equipment Installation, and High Pressure Piping and Accessories.

(1) Background

The labor costs for the installation of the high pressure system are by far the largest element of Kirlin's change claim. Kirlin's labor estimate for this changed work was based on its takeoff of the change and the MCAA Manual. This labor cost claim was based on the loaded rates of \$46.34 per hour for the foreman and \$40.99 per hour for craftsman, and included estimated craftsman hours for the change as well as unproductive foreman's hours, which were estimated as 10 percent of the craftsman's hours. R4, COF 0356. Kirlin's estimate also was based on the use of overtime, with 67 percent of the time estimated to be at straight time and 33 percent to be overtime. *Id.* Kirlin also added to the total labor hours 2 percent of the craftsman's labor hours for quality control time and 2 percent of the craftsman's hours for safety time. *Id.*

The total combined labor costs, as shown on Mr. Hahr's breakdown of the claimed costs from which he testified, total \$515,598.<sup>421</sup> R4, COF 0627; H.Tr., Hahr, 14:235. However, Kirlin has only provided support for \$435,061 in labor costs based upon 9,005 labor hours (7,567 craftsman hours, 1,136 foreman hours and 302 quality control and safety hours).<sup>422</sup> R4, COF 0356; H.Tr., Hahr, 15:62. Since we have been unable to reconcile this discrepancy, we find Kirlin is not entitled to recover for labor costs in excess of \$435,061 for this change.

In contrast, Mr. Sinclair estimated that this changed work should only have taken 3,673 labor hours (3,339 craftsman hours and 334 foreman hours), none of it overtime, with a total labor cost of \$152,344. Resp. Exh. 66 at 28.

(2) Downward Adjustments in Kirlin's Claimed Labor Costs

First, we need to account for the 10-percent overstatement in Kirlin's craftsman labor costs caused by its failure to account for the use of mixed crews of journeymen and apprentices in its

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<sup>420</sup> We note that Mr. Coffey was present and available as a witness during the hearing, but was not called as a witness on this change.

<sup>421</sup>  $\$66,646 + \$10,142 + \$438,810 = \$515,598$ . This does not precisely match up to the total claimed labor costs of \$522,086 reflected in the claim presented by Kirlin for this change. See R4, COF 0613.

<sup>422</sup> During the hearing, Kirlin presented, for another purpose, Appellant's Exhibit 69, which is a labor hour sheet showing 10,292 hours for this change with a base pay/overtime ratio of 55/45. We have not located this document in the Rule 4 file or the supplements thereto. We give no weight to this document in determining the number of labor hours allowable under this change claim, as it was offered for a different purpose after Mr. Hahr's testimony supporting this claim based upon 9,005 claimed labor hours.

labor rates (discussed above). We subtract \$36,137 (10 percent of \$361,373 total craftsman labor costs), *see* R4, COF 0356, from \$435,065 to arrive at a total of \$398,924 in supportable labor costs.

In addition, during cross-examination at the hearing, Mr. Hahr admitted that the claimed labor costs included costs for the installation of the upgrade of the reverse osmosis equipment. H.Tr., Hahr, 16:58-59. As indicated above, Kirlin stated that this work was not done. While Kirlin subsequently calculated a labor cost credit for this work as \$9,658.84, *see* App. Exh. 65, as indicated above, the amount shown for this work on Kirlin's breakdown for these costs was \$10,142 (element H), which amount we disallow. Thus, Kirlin's supportable labor costs are further reduced to \$388,782.<sup>423</sup>

### (3) Unproductive Foreman's Hours

We next discuss the inclusion of the unproductive foreman's hours in Kirlin's labor hour estimate. The hours are a percentage factor added to the craftsman's total hours to estimate the "unproductive" foreman hours spent managing the changed work, including such tasks as planning the work, doing the paper work, timekeeping, doing safety meetings, attending meetings, and quality control. H.Tr., Hahr, 6:44-45, 196-97. These hours are not part of, and are in addition to, the MCAA hourly calculation for the changed work. *Id.* at 6:195. Mr. Hahr testified that he knows that a foreman spends at least this much time "doing nonproductive stuff." *Id.* at 6:198-99. For this claim, the nonproductive foreman hours were calculated at 10 percent of the craftsman's total labor hours. Mr. Sinclair had no problem with this 10-percent labor hour markup. H.Tr., Sinclair, 26:163. Thus, we find that these unproductive foreman hours can properly be included in the labor hour estimate.

However, we note that on other change claims Kirlin added unproductive foreman hours at a 15-percent rate. *See* H.Tr., Hahr, 6:197. There is no explanation in the record for the higher percentage rate. Since we can see no reason why different percentages would apply to different change claims, we will only allow unproductive foreman hours at a 10-percent rate in resolving Kirlin's other change claims.

### (4) Quality Control and Safety Hours

With regard to the 2-percent markups for quality control and safety made to the craftsman's hours, Mr. Hahr explains that they are "to take care of things like tool box safety talks, just basic general quality control, daily report forms, all of the nonproductive times related to safety and [quality control] work that the craftsman do." H.Tr., Hahr, 6:121. Mr. Sinclair found that this markup in hours for safety and quality control time should not be allowed because "the added [quality control] time and added safety time were really just pumping up the costs of this change, and they were unnecessary." H.Tr., Sinclair, 26:166.

We find it significant that Mr. Hahr testified that these markups for safety and quality control were only "sometimes" used by Kirlin in their estimating, "[d]epending on the requirements of

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<sup>423</sup> \$398,924 - \$10,142 = \$388,782.

the project.” H.Tr., Hahr, 6:198. In fact, Kirlin sometimes did not include these hours in other change claims on this project. *See, e.g.*, R4, 1132. Mr. Hahr did not explain why the requirements of the Botanic Garden renovation project differed from Kirlin’s other projects, where it evidently sometimes did not apply these markups in pricing change claims, or why these markups should be added to this but not other Kirlin change claims. As indicated above, Mr. Hahr was relatively nonspecific in identifying why 4 percent of the craftsman’s time would be unproductive because of safety and quality control. Under the circumstances, Kirlin has not met its burden of showing that these hours were appropriately included in its labor hour estimates and that portion of its change claims including these hours is disallowed. For this change claim, the cost for the quality control and safety time totaled \$12,408, which amount we disallow. Thus, Kirlin’s allowable labor costs are further reduced to \$376,304.<sup>424</sup>

#### (5) Overtime

With regard to the overtime claimed, we note that Mr. Sinclair’s estimate disallowed all overtime. As indicated, the contract generally prohibited overtime unless expressly approved by AOC. R4, K0042. While no express approval of overtime for this changed work was given by AOC (nor was it expressly prohibited either), Mr. Hahr testified that, given the late date of the change to this system, this change effectively directed Clark/Kirlin to work overtime to complete this work because that was the only way it could be completed without delaying the completion of the project and in fact Kirlin did perform overtime work to accomplish this work. H.Tr., Hahr, 14:252-53. Even though no CPM testimony was given on this point, our review indicates that this work was near critical path work, given the lateness of this fundamental change in the fogging system. In this regard, we note that Mr. Kern’s fragnet analysis showed the fogging system work on the critical path for some period of time. C4 Supp. 05 01148. Mr. Sinclair provides no supportable reasons for his conclusion that overtime should not be allowed. H.Tr., Sinclair, 26:163-65. Under the circumstances, we credit Mr. Hahr’s testimony that overtime was necessary to accomplish this change without adversely impacting the overall contract completion date, and find that overtime can be allowed for this element of the claim. We also have no basis to disagree with Kirlin’s 67/33 ratio in determining the amount of allowable overtime.<sup>425</sup> R4, COF 0356.

#### (6) Labor Hours for Testing High Pressure System

As noted, the labor hours estimated by Kirlin and Mr. Sinclair for this change are dramatically different, and for the most part their respective estimates are supported or not supported to basically the same degree, with one exception. That is, Kirlin has persuaded us that the amount of hours allowed by Mr. Sinclair for testing the high pressure system (192 hours) is insufficient and we find reasonable Kirlin’s estimated 960 hours for this activity. R4, COF 0629; Resp. Exh. 66 at 30. In this regard, in contrast to other aspects of the labor hours claimed for this change,

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<sup>424</sup> \$388,782 - \$12,408 = \$376,304.

<sup>425</sup> We note that other Kirlin change claims also include overtime. They will be separately analyzed to ascertain whether it was necessary to accomplish the changed work without delaying the overall completion date of the project.

Mr. Hahr sufficiently described the nature of this testing of 12 zones at 1000 psi to support these costs and Mr. Sinclair did not adequately explain the basis for his estimate. *See* H.Tr., Hahr, 14:246; Sinclair, 26:176-77.

#### (7) Cost Difference Between Low and High Pressure Systems

With respect to the rest of the vast difference between the parties' estimated labor hours for this change, a major concern of the Board is the fact that AOC and DMJM expected that the change from a low pressure system to a high pressure system would take less hours and save money. Indeed, as indicated above, in competitive proposals submitted in response to the solicitation, Clark's offered price for a high pressure system was \$190,000 and its price for a low pressure system was \$480,000. Mr. Murphy credibly testified that the reasons that a high pressure system should cost less included: (1) deletion of some large expensive air compressors, (2) significantly less and smaller diameter pipe, and (3) significantly fewer spray nozzles.<sup>426</sup> H.Tr., Murphy, 25:271-74. Moreover, Mr. Hahr admitted that a high pressure system involved less pipe than a low pressure system. H.Tr., Hahr, 15:65. This admission was the only evidence of a comparison by Kirlin of the costs of high pressure and low pressure systems in response to AOC's consistent assertions, both prior to and during this appeal, that a high pressure system should cost less, not significantly more, *see e.g.*, COD, Revised Fogging System; indeed, Mr. Hahr testified that he had performed no analysis comparing the costs of the installation of the two systems. H.Tr., Hahr, 15:175-76.

Mr. Hahr did testify that the high pressure system required by this change required 12 zones rather than the originally specified 10 zones, which meant that there had to be 12 separate runs of pipe from the basement rather than 10 separate runs. H.Tr., Hahr, 15:66-67. These additional runs would add costs. Moreover, unlike the originally specified high pressure system on which Clark submitted the \$190,000 price, this high pressure system was to be done on a "design/build" basis and the original DMJM drawings for the high pressure system could not be used. *See* H.Tr., Murphy, 25:302-03. Finally, we would expect a premium on the high pressure system costs because of the lateness of the change and the need to work overtime to accomplish it.

Nevertheless, we are still troubled by the un rebutted evidence in the record (including Mr. Murphy's testimony, Mr. Hahr's admission that less pipe is involved in installing a high pressure system, and Clark's proposed prices for the two systems) that an installed high pressure system should cost significantly less than an installed low pressure system, and are unconvinced that the factors discussed in the immediately preceding paragraph completely account for why Kirlin's cost for the installation of the high pressure system was more than double what it had contracted for to install the low pressure system.

AOC asserts that because Kirlin's claim is based on estimated rather than actual costs and because a high pressure system should cost less than a low pressure system, Kirlin's claim should be regarded as unreasonably high or inflated in the absence of evidence to the contrary. *See* Resp. PFF, part 2, tab I; Resp. Reply Brief, part 5, at 72-73. We agree with AOC's basic

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<sup>426</sup> Mr. Murphy, who participated in the piping design for the project, was accepted as an expert by the Board in piping and piping pricing. H.Tr., Murphy, 6:133-38.

point, but not its conclusion that Kirlin's claim for this change should therefore be denied in total.

#### (8) Jury Verdict

As noted, both Kirlin's and Mr. Sinclair's assessment of the value of this change are based on estimates of the labor hours. Except for Mr. Sinclair's conclusions regarding the use of overtime and testing, we find his documented estimate to be just as persuasive as Kirlin's estimate regarding the amount of labor hours needed to perform this changed work, particularly given the evidence in the record suggesting that the installation of a high pressure system should cost less than the installation of a low pressure system and that Mr. Hahr's explanation of Kirlin's estimate in this regard is just as conclusory (albeit by an individual with more knowledge of the system) as Mr. Sinclair's estimate (supported by his expert testimony).<sup>427</sup> Compare R4, COF 0356; H.Tr., Hahr, 14:237, 251-52, 15:61-62 with Resp. Exh. 66 at 28, 30; H.Tr., Sinclair, 26:135-36, 171-75.

In the absence of a more reliable method of determining damages here, we believe this is an appropriate case for a jury verdict as to the amount of the labor costs that should be allowed Kirlin for this change. See *Northrop Grumman Corp. v. United States*, 47 Fed. Cl. at 98. In determining the amount of the jury verdict, we compare the \$376,074 for labor costs (the amount which, for the reasons stated above, we have found to be maximum amount that is in play for Kirlin) with Mr. Sinclair's adjusted estimate for labor costs of \$193,466 (adjusted to account for Mr. Sinclair's underestimating of the labor hours for testing and his inclusion of labor hours for the upgrade of the reverse osmosis equipment that Kirlin now admits should not have been included in its proposal,<sup>428</sup> and to account for Mr. Sinclair's failure to include overtime in his estimate and for the downwardly adjusted Kirlin craftsman rates).<sup>429</sup> Since we attribute equal

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<sup>427</sup> While Kirlin generally questions Mr. Sinclair's labor hour estimate, for example, noting that he did not actually witness the fogging system being installed, it has not shown that his labor hour estimate is unfounded or unreasonable.

<sup>428</sup> As indicated above, we find that Mr. Sinclair underestimated the craftsman hours needed for testing by 768 hours (960 hours – 192 hours). With regard to the upgrades to the reverse osmosis equipment, Mr. Sinclair allowed 168 hours for the installation of this equipment, hours that should not be included in this estimate because Kirlin now states that this work was not done. Resp. Exh. 66 at 18, 30; H.Tr., Hahr, 15:58-59. To account for these discrepancies, we add the net 600 hours (768 hours – 168 hours) to Mr. Sinclair's estimated 3,339 hours for craftsman to adjust his labor hour estimate to 3,999 hours to allow for a proper comparison to Kirlin's revised estimate. Adding in the "unproductive" foreman hours, which are calculated at 10 percent of the craftsman hours, H.Tr., Sinclair, 26:163, we adjust Mr. Sinclair's estimate to 4,399 hours (3,999 hours + 400 hours).

<sup>429</sup> As indicated above, Mr. Sinclair's labor cost estimate was \$152,344. In adjusting Mr. Sinclair's estimate to allow for a proper comparison to Kirlin's adjusted estimate, we use Kirlin's 67/33 ratio in calculating overtime. For proper comparison purposes, we also use Kirlin's proposed foreman and craftsman labor rates, although we need to adjust Kirlin's craftsman labor rates by 10 percent downward because of Kirlin's overstatement in its craftsman labor rate caused by its apparent failure to account for apprentice labor hours and rates. Thus, Mr. Sinclair's adjusted estimate is the sum of the following figures: \$12,414 (foreman's straight time at \$46.32 rate for 268 hours), \$9,175 (foreman's overtime at \$69.51 rate for 132 hours), \$98,828 (craftsman's straight time at adjusted \$36.89 rate (\$40.99 - \$4.10

credibility to Kirlin's and Mr. Sinclair's adjusted labor cost estimates, we find that Kirlin is entitled to recover \$284,770 (the midpoint between \$376,074 and \$193,466) in labor costs for this element of the change.

j. Material for High Pressure Piping and Accessories.

Kirlin's claim here includes \$27,425 for 1,025 hangers at \$25,625 and testing material at \$1,800. R4, COF 0629. As indicated above, Kirlin's material prices are based upon a standard estimating guide. H.Tr., Hahr, 6:37, 6:179-81, 9:112. Mr. Sinclair's estimate allows \$20,500 for the hangers and disallows the testing costs. Resp. Exh. 66 at 25. In this regard, Mr. Sinclair did not take exception to the quantity of hangers, but estimated their unit cost as \$20 rather than the \$25 per unit estimated by Kirlin. Resp. Exh. 66 at 25; H.Tr., Hahr, 14:245-46.

We first find that Kirlin has adequately explained the basis for the \$1,800 in testing costs and we allow the recovery of those costs. H.Tr., Hahr, 14:246. However, neither party has produced anything other than dollar estimates for the hanger costs, and we find that their estimates for this material are equally credible. Thus, we find that Kirlin should be allowed \$23,063 (the midpoint between (\$25,625 and \$20,500) for its hanger costs. In sum, we find Kirlin is entitled to recover \$24,863 in material costs for this element of the change.<sup>430</sup>

k. Rental Equipment/Tools

Kirlin claims \$14,326 for rental and tool costs of equipment owned by Kirlin and used for this changed work. R4, COF 0630. The rental equipment/tool costs are separately listed and priced in each of Kirlin's change claims. Mr. Hahr testified that these costs are for the tools required to do the changed work, and that the rates for these tools are "internal rates that are charged to our projects, based on the amount of time that we have the tools on the job," which rate covers "the cost of purchasing, keeping the equipment up and replacing the equipment," but not necessarily actual costs. H.Tr., Hahr, 6:89, 6:192-94. Mr. Sinclair did not disagree with the basic methodology used by Kirlin in estimating these costs. H.Tr., Sinclair, 26:135.

Here too, in the absence of countervailing evidence showing an application of this methodology will not result in an accurate estimate for the changed work, we will accept Kirlin's method of estimating rental equipment/tool costs in its change claims. See *Granite-Groves (JV)*, ENGBCA No. 5674, October 27, 1992, 93-1 BCA ¶ 25,475 at 126,910-11; cf. *Hoffman Constr. Co.*, DOTBCA No. 2551, October 20, 1994, 94-3 BCA ¶ 27,246 at 135,767-68 (unsupported charges for contractor-owned tools and rentals in change proposal not allowed where there was no evidence that the contractor actually incurred these extra costs as a result of the change).

For this claim, Kirlin's rental/tool costs are for a booster pump, a drill motor, a hydro test pump, a fork lift extension boom, a portaband, a scissors lift, ladders, and benders. This estimate is said to be based upon an assumption of 8,648 craftsman's hours where these rentals and tools will be

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(10% of \$40.99) for 2,679 hours); and \$73,049 (craftsman's overtime at adjusted \$55.34 rate (\$61.49 - \$6.15 (10% of \$61.49) for 1,320 hours) = \$193,466. See R4, COF 0356.

<sup>430</sup> \$1,800 + \$23,063 = \$24,863.

used, which translates to 1,081 days, and, using a 10 man crew, the rental equipment and tools would be used for 108 days. R4, COF 0630; H.Tr., Hahr, 14:246.

Based upon his calculation of the necessary craftsman's hours of 3,339 hours with 10-man crews, Mr. Sinclair calculates that the duration of using these tools to be only 42 days and thus allows only 42/108 of the claimed costs, or \$5,572. Resp. Exh. 66 at 27; H.Tr., Sinclair, 26:134-35. Mr. Sinclair does not otherwise argue that the tools would not be used specifically for this change,<sup>431</sup> or disagree with the unit costs employed by Kirlin or the methodology used to estimate these costs.

We have found evidence in the record that indicates that the actual duration of Kirlin's performance of this changed work more closely approximated Kirlin's estimate than Mr. Sinclair's. See R4, COF 0370-71. Thus, we find Kirlin entitled to recover \$14,326 for this element of the change.

#### I. Coordination/Drafting Costs

Kirlin claims \$59,024 in coordination/drafting costs for this change. R4, COF 0631. The primary tasks covered by these costs are the preparation of installation drawings to "give to the craftsman, so they can install the work in the field in a productive manner." H.Tr., Hahr, 6:46. The principal cost of this element is for the hours of a coordinator from Clark's coordination department. The coordinator's hours are calculated based upon a percentage of the total labor hours (usually 10 percent on this project but higher if there was more complexity in a particular change from a coordination standpoint, for example, if there was congestion in the trenches where the pipe affected by the change was to be installed).<sup>432</sup> *Id.* at 6:122-23, 199. The other coordination/drafting costs are for the labor hours of other individuals in the coordination/drafting department, such as the computer technician and scanning technician; these hours were determined as a percentage of the coordinator's labor hours for the change. See, e.g., R4, COF 0631. Also, the costs of any equipment necessary for the preparation of the installation drawings were calculated as a percentage of the coordinator's labor hours and using the Kirlin internal rates for this equipment.<sup>433</sup> *Id.* Finally, the costs of various other material (for example, vellum, mylars, blue lines, and color mylars) for the coordination/drafting effort for the change are estimated, based on the nature of the change. H.Tr., Hahr, 6:201.

In this change request, the estimated hours for the coordinator were 10 percent of 10,291.7 labor hours (1,029.17 hours), which was multiplied by the coordinator's \$48.86 per hour rate to

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<sup>431</sup> The Official Procedure for Making Changes in the contract generally does not allow the recovery of costs for construction equipment/tools, except those that are specially required for a specific change. R4, K0189.

<sup>432</sup> Mr. Hahr testified that these coordination costs are factored into Kirlin's proposed price in preparing its proposals on projects. For renovation projects, Mr. Hahr testified that the percentages to account for this coordination in the project proposal ran from about 12 to 15 percent of the projected labor costs. H.Tr., Hahr, 6:199-200.

<sup>433</sup> This equipment is not part of Kirlin's overhead but is direct charged to jobs. H.Tr., Hahr, 6:200.

determine that individual's estimated cost for this change. R4, COF 0631. The computer technician, the scanning technician and two items of drafting equipment were estimated as 10 percent of the coordinator hours (102.92 hours), and the costs for these individuals and the equipment were determined by multiplying these hours by their respective labor or equipment rates. *Id.* This element also includes various materials totaling \$444. *Id.*

Mr. Sinclair disallowed all of the costs for coordination/drafting because he believed that Kirlin was "pumping up the proposal unnecessarily" because these coordination tasks were things a project manager could do. H.Tr., Sinclair, 26:138-39, 180-81.

Based on our review, we find that Kirlin has shown that these estimated costs for coordination/drafting are generally recoverable as costs of the changed work and that Kirlin's method of estimating these costs is sufficiently reliable to allow their recovery.<sup>434</sup>

However, the coordination/drafting costs are based on the total labor hours for the change and we have not found Kirlin's proposed labor hours for this change to be reasonable, but instead made a jury verdict judgment as to the total labor hours for this change. Under the circumstances, we also will make a jury verdict as to the coordination/drafting costs that may be recovered.

Here, the 10,291.7 labor hours, from which the coordinator's hours were calculated, was not the basis for Kirlin's presentation of its labor hour claim at the hearing, so we will not use it in determining the applicable coordination/drafting costs, but will use Kirlin's documented 9,005 labor hour estimate, as adjusted consistent with our findings above. R4, COF 0356, 0631. We above adjusted the 9,005 hour estimate by subtracting the 185 labor hours associated with upgrade to the reverse osmosis equipment,<sup>435</sup> R4, COF 0346, and the 302 hours for safety and quality control time. R4, COF 0356. This results in an adjusted and supported estimate by Kirlin of 8,518 labor hours to accomplish this changed work.<sup>436</sup> As indicated above, Mr. Sinclair's craftsman hour estimate had to be adjusted upward by a net 600 hours to account for his underestimation of the craftsman hours needed for testing and to remove from his estimate the upgrades to the reverse osmosis equipment, which results in an adjusted and supportable craftsman labor hour estimate of 3,999 hours, to which we add the 10 percent unproductive foreman hours for a total adjusted labor estimate of 4,399 hours. Since we find both adjusted labor hour estimates equally credible, we will calculate Kirlin's coordination/drafting costs based upon 6,459 labor hours (the midpoint between 8,518 and 4,399 labor hours). Using this figure, we find that Kirlin can recover \$37,209 for this element of the change request.<sup>437</sup>

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<sup>434</sup> As explained by Mr. Hahr, these installation drawings are not as-built type drawings, whose costs are included in the 10-percent overhead and cannot be recovered as a direct cost of a change under the contract's Official Procedure for Making Changes in Contracts provision. R4, K0189; H.Tr., Hahr, 6:47-48..

<sup>435</sup> 168 craftsman hours + 17 foreman hours = 185 labor hours.

<sup>436</sup> 9,005 - 185 - 302 = 8,518 labor hours.

<sup>437</sup> This figure is the sum of \$31,559 (645.9 (10% of 6,459 labor hours) x \$48.86) for the coordinator, \$2,049 (64.59 (10% of coordinator's hours) x \$31.72) for the computer technician, \$1,809 (64.59 x

m. Management Costs

Kirlin claims \$17,731 in "management" or "other" costs, which include labor costs for the time of the senior project manager, project manager, estimator/engineer, and foreman for such tasks as estimating the work, submittal review and processing, coordination of trades, and work inspection. R4, COF 0632. Mr. Hahr described these as the costs of "managing the change," including such tasks as estimating, pricing, submitting and scheduling; essentially "all the time it takes related to process that change" and that Kirlin "wouldn't incur [these costs] had the change not occurred." H.Tr., Hahr, 6:48, 6:125, 9:116. The estimated hours are calculated on a change-by-change basis. *Id.* at 6:202. Mr. Sinclair found that these costs should not be allowed. *Id.* at 26:139; Resp. Exh. 66 at 32.

We find that these estimated costs cannot be separately recovered because they either fall within the 10-percent overhead allowance provided in the Official Procedure for Making Changes in Contracts provisions or should be included in the 10-percent unproductive labor hours for foreman. In this regard, the Official Procedure for Making Changes provision states in pertinent part:

2. Percentages for overhead allowed are deemed to include, but shall not be limited to, the following:

1. Field Overhead Items

- Trailer
- Storage Facilities
- Contractor's and subcontractor's superintendence
- Construction equipment tools, except those that are specially required for a specific change
- Utilities
- Contractor's and subcontractor's field office, administrative/support staff
- Cost of preparing record drawing changes, correspondence, etc., relating to the contract
- Job site safety aids
- Cleaning and maintenance of nuisance debris from jobsite

2. Office Overhead Items for Contractor and Subcontractors

- Maintenance/operation of principal or branch offices
- Personnel costs
- Cost for preparing correspondence, fragnets, etc., relating to the contract

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\$28.01) for the scanning technician, \$933 (64.59 x \$14.44) for the vidar scanner/computer/monitor, \$415 (64.59 x \$6.43) for the document plotter, and \$444 for the material costs. See R4, COF 0631.

Cost for insurance and bonds, except for insurance costs relating to direct labor, as outlined in "exhibit A."

R4, K0188-89.

As indicated by the foregoing provision, management and supervision costs, such as those claimed here by Kirlin, are included in the percentage allowance for overhead. *American Federal Contractors, Inc.*, PSBCA No. 1359, February 10, 1987, 87-1 BCA ¶ 19,595 at 99,118-19. Moreover, the expense of preparing a cost estimate in response to a government request for a change proposal is normally (with certain exceptions not applicable here) not compensable. *C.H. Hyperbarics, Inc.*, *supra*; at 161,142; *B.F. Carvin Constr. Co., Inc.*, GSBCA Nos. 12770 *et al.*, January 10, 1995, 95-1 BCA ¶ 27,445 at 136,736-37; *Acme Missiles & Constr. Corp.*, ASBCA No. 11786, December 12, 1969, 69-2 BCA ¶ 8,057 at 37,455.<sup>438</sup> Finally, we note that foreman hours are also included in this element of Kirlin's change claims and Kirlin has not explained why these hours are not part of the 10-percent unproductive foreman hour allowance allowed elsewhere in Kirlin's claim. Thus, we find that Kirlin is not entitled to recover its claimed costs for this element. This finding is equally applicable to all of the other Kirlin change requests decided below.

n. Added Balance Work

The claim also included \$33,000 in vendor costs for balancing the heads in the high pressure system. R4, COF 0623, 0633; H.Tr., Hahr, 15:238-39. However, during the hearing, this claim was withdrawn because Mr. Hahr recalled that the work had not been done. H.Tr., Hahr, 16:8-10.

o. Miscellaneous Other Costs

Kirlin's claim of \$24,019 was for panels (\$7,800), and for costs for drayage, warranty and start up and punch of equipment (\$16,219). R4, COF 0628, 0629. Mr. Sinclair did not take exception to the panel costs and we find Kirlin can recover these costs, as they appear to fair and reasonable. Resp. Exh. 66 at 18.

The claimed drayage, warranty, and start-up and punch costs were calculated as percentages of the total claimed equipment costs.<sup>439</sup> Drayage was 2 percent of the equipment costs, warranty was 5 percent of the equipment costs, and start-up and punch costs was 2 percent of the equipment costs. Mr. Hahr testified that these markups were for "storing equipment, keeping it in condition ready for installation, warranty costs associated with the installed equipment,

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<sup>438</sup> The exceptions to the rule that preparing cost estimates for changed proposals are not compensable involve situations, such as where the government requested a change proposal for work that turned out not to be within the scope of the contractor and was not performed by the contractor. See *C.H. Hyperbarics, Inc.*, *supra*; at 161,142; *Acme Missiles & Contr. Corp.*, *supra*, at 37,455.

<sup>439</sup> On other, but not all, change claims of Kirlin, these percentages were applied to estimated material costs.

periodic warranty problems . . . and then start-up and punching the equipment.” H.Tr., Hahr, 15:239.

Mr. Sinclair took issue with these costs because he believed that the start-up was already included in the testing costs and the other equipment markups were already priced elsewhere in Kirlin’s proposal. H.Tr., Sinclair, 26:160-61; Resp. Exh. 66 at 18.

Kirlin has not met its burden of showing that the costs included in these equipment markups actually represent costs that Kirlin will incur as a result of this change that were not elsewhere covered in its proposal, or present any evidence showing the bases for the specific markup percentages. Specifically, the 2-percent drayage markup is only said to be for the storage and maintenance of the equipment; yet, Kirlin has not explained why these costs would not be included in the costs encompassed in the 10-percent overhead rate, or provide corroborating data that shows or otherwise explains why the drayage costs would be 2 percent of the equipment costs. With regard to the warranty markup, Kirlin has not explained why the warranty work would not be performed by the equipment manufacturer, which presumably included costs relating to its warranty obligations in the equipment costs, or explain why the warranty costs represent 5 percent of the equipment costs. With regard to start-up and punch costs, Kirlin has not explained why these costs are not included in the labor costs for testing and installing the equipment, or explain why these costs would amount to 2 percent of the equipment costs. In sum, we find that Kirlin is not entitled to recover these equipment markup costs on this or any other change claim.<sup>440</sup>

In sum, Kirlin is entitled to recover \$7,800 for its panel costs under this element of its change claim.

p. Kirlin Claim Conclusion

Thus, Kirlin is entitled to recover \$696,923 for this change (subject to any offsets as a result of the \$480,000 credit taken below against this Clark change claim) calculated as follows:<sup>441</sup>

MEE Equipment	\$137,724
Kirlin’s Low Pressure System Work	\$28,976
Unicon’s Low Pressure System Costs	\$21,447
Unicon’s High Pressure System Costs	\$18,854
Labor Costs	\$284,770
Material for High Pressure Piping and Accessories	\$24,863
Rental Equipment/Tools	\$14,326
Coordination/Drafting Costs	\$37,209
Miscellaneous Other Costs	\$7,800

<sup>440</sup> We similarly find Kirlin has not supported these markups as they were applied to material costs in other change claims. See H.Tr., Hahr, 6:88.

<sup>441</sup> How the \$480,000 credit will be allocated between Clark and Kirlin is a matter for resolution by those parties.

<b>Total Direct Costs</b>	<b>\$575,969</b>
Overhead (10%)	\$57,597
Profit (10%)	\$63,357
<b>Total</b>	<b>\$696,923</b>

### 3. Judd Claim

Judd claimed \$20,047 for electrical work associated with this change. R4, COF 0544. Mr. Mansfield testified that this change significantly disrupted Judd's work, and completely explained the nature and pricing of the claim. H.Tr., Mansfield, 22:9-18. Mr. Sinclair estimated that \$19,343 represented the fair and reasonable value for Judd portion of this change, but neither his report nor his testimony explains the adjustments he made to Judd's estimated costs, nor rebuts Mr. Mansfield's testimony. Resp. Exh. 66 at 13; H.Tr., Sinclair, 26:152. Based on our review, we find that Clark is entitled to recover \$20,047 for this change claim.

### 4. Truland Claim

Clark claims \$7,848 that it paid Truland for other electrical work associated with this change for wiring for the interface panel to the control valves. R4, COF 0363. Mr. Sinclair takes no exception to this claim in his estimate and believes the claimed amount is fair and reasonable. H.Tr., Sinclair, 26:152. Accordingly, we find that Clark is entitled to recover \$7,848 for this change claim.

### 5. Clark Claim

Clark claims \$527 for the time of its project manager and officer engineer. R4, COF 0364. Mr. Sinclair took exception to this claim because he was advised by Mr. Coffey that Clark "basically didn't perform work." H.Tr., Sinclair, 26:153. Because Clark has provided no evidence further explaining this aspect of the claim or rebutting Mr. Sinclair's testimony, we disallow this portion of the claim.

### 6. Conclusion

We determine the amount that Clark should recover under this change by first totaling recoverable amounts of the subcontractors for installing the high pressure system and then applying Clark's 10-percent markup. From this total, we subtract \$480,000, which reflects the credit to which AOC is entitled--the line item price for the low pressure system included in Clark's contract. Finally, since we have determined that this change increased the contract value, Clark is entitled to recover the \$145,000 credit that AOC previously took under the contract for this change. In sum, we find Clark and its subcontractors are entitled to recover \$462,300 for this claim, which we calculate as follows:

Kirlin	\$696,923
Judd	\$20,047
Truland	\$7,848

Subtotal	\$724,818
Clark 10% Markup	\$72,482
Subtotal with markup	\$797,300
Subtract AOC Credit For Low Pressure System	<\$480,000>
Subtotal	\$317,300
Add Clark Credit for Deductive Change Order	\$145,000
<b>Total</b>	<b>\$462,300</b>

## F. P100 Revisions, Clark Change Order No. 810040

### 1. Description of Change

This claim flows from a significant unilateral change issued on June 28, 1999 by AOC to the P100 plumbing contract drawing included in the contract. R4, COF 1368; R4, Drawing P100. Kirlin's claim for this change totals \$505,817. R4, COF 1182. On May 25, 2000, AOC issued a unilateral change order to the contract determining that its liability for this change was \$136,000. R4, COF 1295.

The P100 drawing shows the basement floor plan plumbing. Kirlin was responsible for installing the 6-inch special waste (SW) pipe shown on this drawing. H.Tr., Hahr, 14:147. The basic purpose of SW piping system is to direct, by a gravity flow design, water collected from the floor drains and the perimeter trenches that catch condensation from the glazing system throughout the building, to the South Addition, where the water would be treated and put into the public storm sewer system. H.Tr., Hahr, 14:147-8, 154-55, 15:98; Murphy, 25:210. Other relevant piping shown on the P100 drawing were the foundation drainage (FD) piping system and the HVAC underground ventilation ductwork, which were to be installed by Kalos. H.Tr., Hahr, 14:146, 149-50; Murphy, 25:210-11. This drawing reflected that these three systems paralleled each other for much of the length of the Botanic Garden facility and it was the designer's intent that these three systems should share the same underground trench. R4, Drawing P100; H.Tr., Murphy, 25:211-12, 216. Mr. Hahr testified that Kirlin understood the designer's intent of this drawing. H.Tr., Hahr, 14:168.

The revisions to the P100 drawings were significant. App. Exh. 60, Revised P100 Drawing. On the revised P100 drawing, the FD piping was redesignated as planter bed drainage (PBD) piping, and it was now connected into the SW piping system,<sup>442</sup> so that the water from both systems could be treated in the South Addition before being put into the public storm sewer system. H.Tr., Hahr, 14:156-57; Murphy, 25:236. However, the drawing still showed the SW piping paralleling the ventilation ductwork and the redesignated PBD piping in the same place as specified in the initial P100 drawing for much of the length of the Botanic Garden facility. R4, Drawing P100; App. Exh. 60. While Kalos was still responsible for the installation of the PBD piping that was previously shown as FD piping, additional PBD piping was added, which Kirlin installed. H.Tr., Hahr, 14:160-61; App. Exh. 60. In addition, the routing of the SW piping

<sup>442</sup> The FD pipe previously independently ran into the South Addition. H.Tr., Hahr, 14:158-59.

was changed, so that it entered the South Addition at four places instead of the two places originally specified. H.Tr., Hahr, 14:155; App. Exh. 60.

The most significant change, according to Kirlin, was that the revised P100 drawing included a new "invert elevation." H.Tr., Hahr, 14:155-56, 15:111-12. An invert elevation shown on a drawing is the required elevation of the bottom of the inside diameter of the installed pipe at a certain location on the drawing. H.Tr., Hahr, 14:154; Murphy, 25:221. The invert elevation notable to Kirlin here was one for minus 4.3 feet<sup>443</sup> for the SW piping at a point shortly before it entered the South Addition on the east side.<sup>444</sup> H.Tr., Hahr, 14:155-56, 15:111-12.<sup>445</sup> According to Mr. Hahr, there were no invert elevations shown on the initial P100 drawings for the SW pipe, although elevations could be determined from other drawings.<sup>446</sup> H.Tr., Hahr, 14:154, 15:102-03.

Based on this invert elevation, Kirlin decided that the SW pipe was required by the revised drawing to be buried deeper than it had previously planned. *Id.* at 14:166-68, 15:111-12. That is, instead of burying the SW pipe in the same trench and at basically the same depth as the ductwork and the PBD piping, Kirlin believed that it was now required to bury the SW pipe several feet deeper, below the depth where the ductwork and PBD piping would be installed by Kalos. *Id.* at 14:162-69; App. Exh. 61. As carefully and persuasively explained and illustrated by Mr. Hahr in his testimony, this aspect of the change, as interpreted by Kirlin, required considerable excavation and inefficient installation using a trench box,<sup>447</sup> while working around the existing concrete beams that also interfered with the work in the trenches. App. Exh. 61; H.Tr., Hahr, 14:168-82.

In response to the June 28, 1999 unilateral change to the P100 drawings, Kirlin/Clark submitted coordinated drawings to AOC for review on August 25, 1999. R4, COF 1364. The coordination drawings reflected Kirlin's plan to bury the SW pipe deeper in the trench, starting at a height of

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<sup>443</sup> The elevations included in the contract drawings are based on sea level. H.Tr., Murphy, 25:215-16. The average grade of the first floor of the Botanic Garden facility is 11 feet above sea level. *Id.* Thus, minus 4.3-foot elevation is more than 15 feet below the first floor of building.

<sup>444</sup> We note that no similar invert elevation was designated on the west side at the same respective spot, but we find, based on our review of the drawing, as so apparently did Kirlin given that it used the same construction approach on both sides of the Botanic Garden facility, that the same invert elevation would be applicable on that side as well. App. Exh. 60; H.Tr., Hahr, 14:156.

<sup>445</sup> Mr. Hahr also pointed to an invert elevation of minus 1.0-foot on the PBD pipe shortly before it connected to the SW pipe at a point after the minus 4.3-foot invert elevation was shown and before the SW pipe entered the South Addition. H.Tr., Hahr, 14:155-56. This invert elevation was shown on the PBD pipe at the same basic spot on both the east and west sides. App. Exh. 60; H.Tr., Hahr, 14:155-56.

<sup>446</sup> As pointed out by Mr. Murphy, the initial P100 drawings showed an invert elevation of minus 7.6-foot on the SW piping on the west side shortly after it entered the South Addition. R4, Drawing P100; H.Tr., Murphy, 25:220, 26:19-21.

<sup>447</sup> As explained by Mr. Hahr, "a trench box is a steel box that is installed in the ground that as you're digging your ditch, it's got cross-braces inside, and it's designed to keep the men safe when they're down in the ditch." H.Tr., Hahr, 14:172.

minus 3.0-feet at the north end of the facility and gradually descending to minus 4.6-feet where it entered the South Addition. R4, SW0007. This level was 3 feet below where the ductwork and PBD piping were to be installed in the trench at approximately elevation zero feet. H.Tr., Murphy, 26:215.

On November 9, Kirlin submitted a cost proposal totaling \$1,075,346 for this work. R4, 1150. This proposal was submitted to AOC on November 22 with Clark's markup for a total of \$1,182,881. R4, COF 1353.

On November 19, the coordinated drawings were approved by AOC as noted with resubmission required. R4, COF 1363. No specific comment was made by DMJM or AOC regarding Kirlin's plan of installing the SW pipe below the depth of the ductwork and PBD pipe. *See* R4, SW0007.

Meanwhile, on October 5, Kirlin proceeded with this work at Clark's direction based upon reported assurances from a DMJM representative that no significant problems had been found on the coordinated drawings. H.Tr., Hahr, 14:188. Kirlin had basically just started with the work when AOC's comments on the coordination drawing were received in late November. *Id.* at 14:189-90. Most of the deep excavation and installation was completed by the end of January 2000. *Id.* at 14:190.

In February 2000 (after the bulk of the changed work was done), Kirlin's representatives met with representatives of AOC and DMJM where Kirlin explained how the change impacted its work.<sup>448</sup> H.Tr., Hahr, 14:192. On March 17, 2000, Kirlin submitted a revised cost proposal for this work in the amount of \$505,817. R4, COF 1182. On May 25, 2000, AOC issued a unilateral change order to the contract determining that its liability for this change was \$136,000, and Clark's contract was upwardly adjusted by this amount. R4, COF 1295.

## 2. Kirlin's Deviant Means and Methods

AOC and DMJM maintain that the revised drawing did not require Kirlin to bury the SW pipe at the depth it did. Mr. Murphy of DMJM explains that the revised drawings contemplated that the SW pipe could be installed in (not below) the same trench as the ductwork and PBD piping; and after that run of pipe, the depth of the SW pipe would then be dropped vertically, using risers, at a point where an "elbow down" is designated on the drawing, so as to meet the minus 4.3-foot invert elevation requirement, from which point the SW piping would then run into the South Addition.<sup>449</sup> H.Tr., Murphy, 25:210-11, 216-19, 240-43; 26:12, 14. Specifically, the drawing showed a symbol on the SW piping designating an "elbow down," where the piping completed its east-west run and turned south just above the point where the minus 4.3-foot invert elevation

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<sup>448</sup> Apparently, this was the first time the parties met to discuss the impact of this change.

<sup>449</sup> A riser is a vertical section of piping, typically perpendicular to the horizontal one. H.Tr., Murphy, 26:12.

was designated, after which point the SW piping entered the South Addition.<sup>450</sup> App. Exh. 60; H.Tr., Hahr, 15:114; H.Tr., Murphy, 25:241.

We find that Kirlin did not understand the significance of the “elbow down” symbol on this drawing or AOC’s/DMJM’s design intent that the SW piping would vertically drop at that point to satisfy the minus 4.3 invert elevation requirement, or that its proposed approach to this change was not compliant with revised P100 drawing. In this regard, when this symbol was brought to Mr. Hahr’s attention during cross examination at the hearing, he was unaware of its meaning, much less its significance in the design. See H.Tr., Hahr, 15:114-18. Consistent with Mr. Hahr’s testimony, the coordination drawings submitted by Kirlin did not show an “elbow down” at this point, as shown on the revised P100 drawing, R4, SW0007, and thus were noncompliant with the revised drawing. H.Tr., Murphy, 25:258-59; 26:45-47. While the revised P100 drawing could, and probably should, have more explicitly indicated the magnitude of the vertical drop at this point, Kirlin was not free to simply ignore the “elbow down” symbol, but, at a minimum, should have specifically queried AOC about the intent of the drawing.<sup>451</sup>

When AOC/DMJM reviewed the coordinated drawings, it noticed this discrepancy and deviation from the design drawings. H.Tr., Murphy, 25:265-66; 26:40. Nevertheless, it was found that Kirlin’s proposed means and methods of installing the SW piping system in the manner that it proposed and ultimately did, instead of the manner contemplated by the design drawings, satisfied AOC’s actual requirements.<sup>452</sup> H.Tr., Murphy, 15:265-66. Although AOC noted exceptions on, and required resubmission of, the coordinated drawings,<sup>453</sup> none of the specific noted exceptions specifically addressed, or was relevant to, this Kirlin deviation from the design drawings, and there is no evidence that AOC/DMJM otherwise specifically advised Kirlin of this deviation before it completed this changed work.

However, AOC included the following note on the returned coordination drawings:

Contractor should be responsible in coordinating all changes to piping routing with all disciplines and all necessary materials resulting in these modifications shall be provided without extra cost to the AOC.

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<sup>450</sup> The “elbow down” symbol is a circle-like symbol with one end open and a line representing the pipe entering the open end of the circle, and is so identified and defined on Drawing P001. It is a standard symbol of the American Society of Plumbing Engineers. H.Tr., Murphy, 25:209.

<sup>451</sup> While Kirlin notes that neither the revised P100 drawing nor the pertinent riser drawings included in the contract specifically note that a riser is required at the “elbow down” point, H.Tr., Murphy, 26:31-39, the riser drawing, which specifically denotes that it is not to scale, does in fact show that the depth of the SW pipe drops at that point. R4, SWASTE0002, Drawing P201; H.Tr., Murphy, 26:33-34.

<sup>452</sup> Mr. Murphy explained that “[j]ust as long as it’s [*i.e.*, the SW piping] graded at a constant pitch and it doesn’t go lower at this point then what we’d originally called for [*i.e.*, minus 4.3-foot invert elevation], we will still get positive drainage and it doesn’t impact any of the other design aspect that we had intended.” H.Tr., Murphy, 25:265.

<sup>453</sup> There is no evidence in the record that indicates that these coordinated drawing was resubmitted or approved.

R4, SWASTE 0007. Mr. Murphy testified that by this note AOC was advising Kirlin "that any deviation that was being made was being made at the contractor's own choice and would be made at no expense to the [AOC]," H.Tr., Murphy, 25:266, and that to the extent that Kirlin was deviating from the drawings it was on Kirlin's "nickel." *Id.* at 26:45-46. AOC therefore contends that it should not be liable for those portions of Kirlin's change claim that relate to Kirlin's unreasonable noncompliant means and method of accomplishing this work, for example, Kirlin's substantial excavation and labor costs.

As indicated above, the contractor must prove three necessary elements: (1) liability--that the government did something that changed the contractor's costs, for which the government is legally liable; (2) causation--that there exists a causal nexus between the basis for liability and the claimed increase in costs; and (3) resultant injury. *Servidone Constr. Corp. v. United States*, 931 F.2d at 861. However, as was observed by the Court of Claims:

Equitable adjustments in this context are simply corrective measures utilized to keep a contractor whole when the Government modifies a contract. Since the purpose underlying such adjustments is to safeguard the contractor against increased costs engendered by the modification, it appears patent that the measure of damages cannot be the value received the Government, but must be more closely related to and contingent upon the altered position in which the contractor finds himself by reason of the modification.

*Bruce Constr. Corp. v. United States*, 163 Ct. Cl. at 100. Thus, the Court of Claims stated that the costs resulting from a change must be a "reasonable cost," which considers such matters as "[t]he particular situation in which a contractor found himself at the time the costs was incurred" and "the exercise of the contractor's business judgment," but in any case "must be viewed in the light of a *particular* contractor's costs" and "not the universal, objective determination of what the cost would have been to other contractors at large." *Id.* at 101. That is, the reasonable costs incurred as a result of a change need not represent the most efficient or cheapest possible way; rather they must be reasonable for that contractor, including whether the contractor acted prudently within its experience and capabilities. *Lamb Eng'g & Constr. Co.*, EBCA No. C-9304172, July 28, 1997, 97-2 BCA ¶ 29,207 at 145,346; *Pipe Installation Co., Inc.*, VABCA No. 2157, May 30, 1986, 86-3 BCA ¶ 19,055 at 96,247. A presumption has been found that a contractor's proved or actual costs in implementing a change are reasonable, such that the government "must carry the very heavy burden" of showing that the proved or actual costs were of such a nature that they should not have been expended or that the contractors' costs were more than were justified in the particular circumstance. *See Bruce Constr. Corp.* 163 Ct. Cl. at 102-03.

Ordinarily, we would say that AOC met its burden of showing that Kirlin did not proceed prudently within its experience and capabilities when Kirlin used a means and method of accomplishing this work that was not only much more expensive, but was also inconsistent with the drawings implementing the change. However, here the agency was specifically advised and cognizant of Kirlin's proposed noncompliant and more costly approach that nevertheless would satisfy the government's requirements, some months before Kirlin started implementing the

change, but did not specifically advise Kirlin of the discrepancy in its approach, even though Kirlin had already presented AOC with a claim of \$1,075,346 for this change whereas DMJM had estimated \$20,000 as the cost of the change. R4, 1150, 1369. The note on the coordination drawings, by which AOC says that it intended to advise Kirlin that the extra costs associated with its means and methods were on Kirlin's "nickel," was far too subtle and ambiguous to apprise Kirlin that its proposed approach of implementing this change was noncompliant (or why this was the case) and that its costs of implementing the change in this manner would not be reimbursed.

Under the circumstances, given that AOC was specifically advised of, and given the opportunity to comment on, Kirlin's approach before it implemented the change, we believe that AOC is essentially estopped from arguing that Kirlin acted imprudently in proceeding with its means and method in implementing the change.<sup>454</sup> See *Safeco Insurance Company of America*, ASBCA No. 52107, July 30, 2003, 03-2 BCA ¶ 32,341 at 160,017 (agency advised that employee would remain on site and agency did not direct his removal, even though it was requested for directions to the contrary); *Fireman's Fund Insurance Co.*, ASBCA No. 39666, September 17, 1990, 91-1 BCA 23,372 at 117,259 (contractor acted prudently under circumstances of the case when it obtained a quote from a single source with full knowledge of the agency). Thus, we will not disallow Kirlin's costs as they relate to its means and methods of accomplishing this change.<sup>455</sup>

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<sup>454</sup> It is true, as noted by AOC, that ordinarily contractors who proceed without the contractually required approval of the drawings do so at their own risk. See *A.D. Roe Co.*, ASBCA No. 46920, March 16, 1995, 95-1 BCA ¶ 27,591, at 134,477; *Robert McMullan & Sons, Inc.*, ASBCA No. 37173, December 15, 1989, 90-1 BCA ¶ 22,574, at 113,289. Here, however, we cannot say Kirlin's proceeding with its planned installation was imprudent, given AOC/DMJM's failure to adversely comment on this approach in its review of the drawings..

<sup>455</sup> We are nevertheless appalled at the poor communications by both parties with respect to this and other changes. For example, while submitting an inflated million dollar claim for this change and proposing a very expensive (and noncompliant) approach, Kirlin did not submit an RFI regarding this elevation issue, as it had for other elevation issues, see H.Tr., Hahr, 15:122; Murphy, 26:50, even though in an earlier submitted coordination drawings in response to the original P100 design, it had proposed a solution similar to that intended by the revised P100 drawings of having a large vertical drop in the invert elevation of the SW pipe, using a riser, at virtually the same place where the revised P100 drawings envisioned such a vertical drop. Resp. Exh. 28; H.Tr., Murphy, 25:228-31. On the other hand, AOC/DMJM, in the face of a proposed million dollar solution, with at least imputed knowledge of why Kirlin's approach could prove costly, did not clearly advise Kirlin that its proposed expensive solution was noncompliant, that Kirlin was expected to fund the excess costs, or that a much more cost effective solution was available. Proper contract administration requires mutual confidence and respect as well as cooperation and good faith. Cibinic & Nash, *Administration of Government Contracts*, at 3-7. This change claim is but one example of the dysfunctional relationship that the parties maintained during this project.

### 3. Kirlin's Change Claim

For this change, Kirlin has broken down its claim as follows:

Material	\$14,786
Labor Costs	\$174,581
Excavation Costs	\$136,140
Coordination/Drafting Costs	\$69,735
Field Office Expense	\$18,649
<b>Subtotal</b>	<b>\$413,891</b>
Overhead (10%)	\$41,389
Profit (10%)	\$45,528
<b>Subtotal</b>	<b>\$500,809</b>
Bond Costs (1%)	\$5,008
<b>Total</b>	<b>\$505,817</b>

R4, COF 1183.

### 4. Material Costs

Kirlin calculated its \$14,786 in material costs from a takeoff of the originally issued and revised P100 drawings. This takeoff assertedly reflects both the addition and deletion of material resulting from the change, for example, the added PBD piping and changes in the configuration of the SW piping. H.Tr., Hahr, 14:193-94; R4, COF 1190. The results of Kirlin's takeoff listed, for each of the materials used in this change, the affected quantity and unit price, as listed in the Harris National Mechanical Estimator. R4, COF 1190; H.Tr., Hahr, 6:179-81, 9:112.

Mr. Sinclair also performed and documented his takeoff from the design drawings affected by this change and determined that the estimated costs for the net additional materials for this change were \$4,702. Resp. Exh. 66 at 7-9; H.Tr., Sinclair, 26:107-112. In support of his material estimate, Mr. Sinclair provided his actual takeoff, as marked on the design drawings. Resp. Exh. 67. Mr. Sinclair's material pricing is based upon "pricing information booklets, Harris, or any plumbing supply house that we call from time to time to get material prices." H.Tr., Sinclair, 26:111-12.

In addition, as indicated above, while he was not a witness at the hearing on this subject, Mr. Heroy also prepared an estimate for this change claim, which was made part of this record. R4, COF 1158-81. In making this estimate, Mr. Heroy adopted Mr. Sinclair's materials estimate, after spot-checking the results of Kirlin's and Mr. Sinclair's takeoffs with respect to the most expensive material item, the 6-inch SW pipe. Kirlin's takeoff analysis resulted in an estimated 315-lineal foot increase in the SW pipe and Mr. Sinclair's takeoff analysis resulted in an estimated 74-lineal foot decrease in the SW pipe. Based on his own takeoff analysis, Mr. Heroy determined that the SW piping should have decreased by 79 lineal feet. R4, COF 1167.

Mr. Hahr specifically disputed this aspect of Mr. Heroy's analysis because it assertedly did not take into account the added PBD piping. H.Tr., Hahr, 14:206-07. However, the revised P100

drawings show that the added PBD piping was 4-inch pipe and Mr. Sinclair's materials estimate (and thus Mr. Heroy's estimate) recognizes a quantity of 4-inch pipe. App. Exh. 60; Resp. Exh. 66 at 8. Moreover, Mr. Hahr's testimony regarding the nature of the P100 changes is consistent with an overall decrease in the 6-inch SW piping. See App. Exh. 60; H.Tr., Hahr, 14:153-55. Finally, Kirlin has not otherwise pointed to any specific flaws affecting Mr. Sinclair's materials estimate.

Under the circumstances, we find that Mr. Sinclair's material estimates more accurately represent the actual material costs than Kirlin's estimate, and find that Kirlin is entitled to recover \$4,702 in material costs.

## 5. Labor Costs

Here, Kirlin claims \$174,581 in labor costs. These were based upon Kirlin's estimated 3,767 craftsman labor hours plus 377 unproductive foreman hours for this change.<sup>456</sup> R4, COF 1186. According to Mr. Hahr, Kirlin's estimate of 3,767 labor hours was based upon three elements: (1) the labor hours calculated based upon the material estimates determined from its takeoff (described above) and the "labor units" for these materials, as set forth in the MCAA Manual, which Kirlin calculated as 366 hours, R4, COF 1184; H.Tr., Hahr, 14:195, 200; plus (2) "the actual hours we spent, 3,509 hours of installation time from the period of [October 8] to the end of January," H.Tr., Hahr, 14:195-96; and minus (3) 108 labor hours credit for "the original labor that we had at the production rate to install the pipe . . . basically in an open condition, which was a significant change to how it actually happened." *Id.* at 14:196; R4, COF 1184.

While Kirlin does not clearly explain the details of this labor hour calculation in its claim or testimony, it appears that Kirlin's first figure in its calculation is its estimated labor hours based on the takeoff of the materials estimated for this change. R4, COF 1184. Kirlin then estimated the added costs due to the inefficient way that it installed the SW piping at the depth it did by capturing its actual Kirlin labor hours for the period from October 8, 1999 to January 31, 2000--3,899 labor hours--and, estimating that 90 percent of these hours were devoted to this inefficient work, determining that 3,509 labor hours were applicable to this change.<sup>457</sup> *Id.* Kirlin added this inefficient labor estimate to the takeoff estimate. From this total, Kirlin gives "credit for [the] original production rate" of 108 labor hours for installing the affected SW piping, assuming a production rate of 4 feet per hour for the 430 feet of estimated affected SW piping. The result of these calculations is Kirlin's total claimed 3,767 craftsman labor hours. *Id.*

Mr. Sinclair's estimate of 126 labor hours and \$5,718 is based on his materials takeoff analysis. Resp. Exh. 66 at 8; H.Tr., Sinclair, 26:110-11. The labor units employed by Mr. Sinclair were not derived from the MCAA Manual, but from the data banks of DMS, which collected this

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<sup>456</sup> Kirlin's claimed labor hours here do not include hours for unproductive safety or quality control time.

<sup>457</sup> The backup sheet included the following statement with regard to the calculated 3,509 hours: "ADDITIONAL HOURS FROM 10/8/99 TO 1/31/00. THIS TIME FRAME IS USED ONLY TO COVER THE PORTION OF WORK NOT IN DISPUTE. WE ESTIMATE 90% OF THE TOTAL HOURS." R4, COF 1184.

information from contractor's estimates for projects or changes. *Id.* at 26:112. However, Mr. Sinclair's estimate did not account for the loss of labor productivity caused by Kirlin's means and method of installing the SW piping at the depth it did. *Id.* at 26:198-99, 203.

As indicated above, Mr. Heroy also prepared an estimate of the change. Mr. Heroy's estimate considered Kirlin's actual means and methods of accomplishing the work and he determined, for a variety of reasons, that the supportable "labor overrun" associated with this change was \$121,739. R4, COF 1169-71.

We will accept Kirlin's proposed methodology for purposes of determining how many craftsman labor hours should be estimated for actually performing this changed work under the inefficient manner that it did. However, based on our review, we have found a variety of problems with the accuracy of the estimates contained in the first two elements of its calculation.

As noted, the first element used in Kirlin's calculation of its estimated craftsman hours is based solely upon Kirlin's takeoff analysis of the change that determined the materials implicated by the change without regard to the inefficient installation of the SW piping issue. As discussed above, we found Mr. Sinclair's takeoff conclusion with regard to the materials to be more credible than Kirlin's. Thus, we think that Mr. Sinclair's estimated 126 labor hours, based upon the materials determined in his takeoff analysis, is more credible than Kirlin's 366 labor hour estimate, and should be used as the first element in this Kirlin labor hour calculation.

With regard to the second element of Kirlin's craftsman hour calculation, we find that Kirlin's assumption that the inefficient aspects of this change accounted for 90 percent of Kirlin's total labor hours during this period is not supported by the record. As noted by Mr. Heroy, the job codes used by Kirlin to identify its work during this period cannot be specifically traced to the inefficient portion of the SW piping installation work. R4, COF 1169, 1191, 1216. Nevertheless, he found, based on his review of the limited documentation available, that at least 490 of the labor hours (more than 10 percent of the total 3,899 hours) were for South Addition work.<sup>458</sup> R4, COF 1169, 1216. In addition, we note that 91 of the hours claimed were for "coord[ination]/sched[ule] & layout," which are labor hours that would be presumably covered under Kirlin's coordination/drafting costs, which is a separate part of this claim under Kirlin's change claim methodology. R4, COF 1216. Moreover, the record evidences that Kirlin's 3,899 labor hour estimate includes hours for work performed on this change that do not involve the inefficient SW piping installation method. *See* R4, COF 1170.

To determine the number of labor hours for this element of Kirlin's labor hour estimate, we first subtract the 91 hours apparently covered by the coordination/drafting hours elsewhere included in this change from the 3,899 hours claimed. We also find, based upon the evidence referenced above, that indicates that Kirlin's 90-percent estimate was unsupported and excessive, and that only 80 percent of the remaining 3,808 labor hours during this period--that is, 3,046 labor hours--

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<sup>458</sup> While, as indicated, Mr. Hahr commented on various aspects of Mr. Heroy's analysis, he did not contradict Mr. Heroy's findings with regard to the make up of the labor hours constituting the second element of Kirlin's labor hour estimate. *See* H.Tr., Hahr, 14:207-09.

can reasonably be attributed to the inefficient SW piping installation work. Thus, we find that 3,046 labor hours should be used as the second element of Kirlin's labor hour calculation.

With regard to the third element of Kirlin's craftsman hour calculation, the record shows that Kirlin based its credit upon installing 430 linear feet of SW piping at a rate of 4 feet per hour (apparently based on the assumption that the pipe could be installed in the same trench as the ductwork and PBD piping). R4, COF 1184, 1218. While Mr. Heroy accepts the 4 feet per hour production rate, he reports that a "conservative" takeoff analysis of the SW piping from the P100 Drawing showed 1,679 linear feet of SW pipe. R4, COF 1170. Neither party has provided further evidence with regard to the dramatic difference with regard to the affected SW piping, but our review of the revised P100 drawings and Mr. Hahr's testimony with regard to which portion of the SW piping was subject to the inefficient installation reflects that a better estimate for this section of the SW piping is 430 linear feet.<sup>459</sup> App. Exh. 60; H.Tr., Hahr, 165-82. Accordingly, we find that 108 labor hours is a reasonable credit to be used in Kirlin's labor hour calculation for this change.

Thus, using Kirlin's methodology, we conclude that a reasonable estimate of the craftsman labor hours that Kirlin expended on this change is 3,064 craftsman labor hours (126 + 3,046 - 108). Also, for the reasons stated above, we have accepted Kirlin's unproductive foreman hours calculation, which applied a 10-percent factor to the total craftsman labor hours, and we therefore allow 306 foreman labor hours for this change. With regard to the claimed overtime hours, while the record supports that Kirlin worked overtime during the period when this changed work was being performed, R4, COF 1191, there is no evidence that this overtime was authorized as required by the contract, R4, K0042, or that that this overtime was necessary to accomplish the changed work without delaying the overall completion date of the project. Therefore, we do not allow the claimed overtime hours here. Moreover, we need to account for Kirlin's 10-percent overstatement in its craftsman labor rate because of its failure to account for apprentice labor hours and rates ( $\$39.50 - \$3.95 = \$35.55$ ). Applying Kirlin's adjusted labor rate of  $\$35.55$  for craftsman and the labor rate of  $\$42.82$  for foreman, we find Kirlin is entitled to recover  $\$122,028$  in labor costs for this change.<sup>460</sup> R4, COF 1186.

## 6. Excavation Costs

Kirlin's claim includes  $\$136,140$  in excavation costs. As explained by Kirlin, excavation costs not included in its proposal were required to install the SW pipe below the ductwork and PBD pipe and other aspects of this change. H.Tr., Hahr, 14:194. This claim has two components.

First, Kirlin claims  $\$125,465$  in supported, actual costs for rental equipment used to perform the excavation for this change. R4, COF 1185, 1192-1197. However, as pointed out by Mr. Heroy, one of the invoices submitted in support of this claim totaling  $\$19,004$  states that it is for services

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<sup>459</sup> It may be that Mr. Heroy's estimate was for all of the SW piping, and not just the pipe that was to be buried beneath Kalos installed ductwork and PBD piping.

<sup>460</sup>  $\$108,925$  (3,064 labor hours x  $\$35.55$ ) (craftsman labor costs) +  $\$13,103$  (306 labor hours x  $\$42.82$ ) (foreman labor costs) =  $\$122,028$ . See R4, COF 1186.

extending from February 7 through March 4, 2000. R4, COF 1168, 1197. This is after the period when Kirlin indicated that the excavation services claimed for this change were done, R4, COF 1185; H.Tr., Hahr, 14:195-96, 208, and we therefore disallow this amount of Kirlin's claimed excavation equipment rental costs. We have no reason to question the remainder of these claimed costs and find Kirlin is entitled to recover \$106,461 in excavation rental equipment costs.<sup>461</sup>

The other component to Kirlin's excavation cost claim amounts to \$10,675 for 427 hours of laborers at \$25 per hour. R4, COF 1185. According to Mr. Hahr:

We had to bring on laborers who would provide final grade on the ditch, and the backhoe cannot get the bottom of the ditch to a grade sufficient to set the pipe so that we have laborers I there to do that work. They also provide the hand shovel work around the pipe as we're doing the bedding to keep the pipe from moving.

H.Tr., Hahr, 14:194. In response to this aspect of the claim, Mr. Heroy notes that the \$25 hourly rate is not supported by anything in the record and that, based on his review of a sampling of Kirlin's payroll records during this timeframe, it was more likely that Kirlin's actual costs for these laborers was only 70 to 90 percent of a \$25 hourly rate. R4, COF 1168. Kirlin offered no rebuttal to Mr. Heroy's analysis, which only allows Kirlin 90 percent of its claimed costs, or \$9,608, for the laborers. We thus find Kirlin is entitled to only \$9,608 for these costs.

In sum, Kirlin is entitled to recover \$116,069 in excavation costs for this change claim.<sup>462</sup>

## 7. Coordination/Drafting Costs

Kirlin claims \$69,375 in coordination/drafting costs for this change. R4, COF 1187. Kirlin asserts that the revised P100 drawing was issued after it had essentially completed its coordination effort on the original P100 work. H.Tr., Hahr, 14:155, 186. Kirlin asserts, and the record supports, that a significant coordination/drafting effort for the change was required, given the massive nature of this change made after Kirlin had almost completed coordination under the initially issued P100 drawing. H.Tr., Hahr, 14:144-46. As discussed above, this effort included the preparation of installation drawings to allow for productive installation of the pipe. H.Tr., Hahr, 6:46.

This aspect of the claim was estimated in a different manner than the way Kirlin estimated the coordination/drafting costs for its other change claims, where Kirlin based its coordination/drafting costs upon a percentage of the total labor hours that it had estimated for the particular change, a methodology we found could serve as a reasonable basis for calculating such costs.

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<sup>461</sup> \$125,465 - \$19,004 = \$106,461. Mr. Heroy also points to an invoice from the same vendor stating that it is for services extending from January 4 through February 4, 2000 for \$14,279, and questions this cost because the rental period extends past January 31. R4, COF 1168, 1196. However, given that virtually all of this rental was prior to January 31 and very little extended after that date, we see no reason to disallow these costs.

<sup>462</sup> \$106,461 + \$9,608 = \$116,069.

For this change, however, Kirlin first determined the total labor hours it had devoted to drafting labor for the months May, June, July and August 1999, that is, 1071.5 hours. R4, COF 1200; H.Tr., Hahr, 14:197. Based upon Kirlin's estimate that 80 percent of these hours were devoted to the P100 change, Kirlin estimated the 857.2 labor hours for its coordinator for this change at a labor rate of \$48.86 per hour for a total \$41,883.<sup>463</sup> R4, COF 1187, 1200; H.Tr., Hahr, 14:197.

As discussed above, in its change claims, Kirlin calculated the rest of its coordination hours and costs based upon percentages of the coordinator's labor hours. Here, Kirlin's claim included labor hours for the senior coordinator estimated as 20 percent of the coordinator's hours, the coordinator manager at 10 percent of the senior coordinator's hours, and the computer technician, the scanning technician and the "repo." technician at 10 percent each of the coordinator's hours. Kirlin's claim stated the applicable labor rates for each of these personnel (which we have found reasonable).

With regard to the drafting equipment, the computer with monitor was estimated as the same hours as the coordinator, the vidar scanner/computer/monitor and document plotter at 10 percent each of the coordinator's hours, and the plotter and "blue prints" at 5 percent each of the coordinator's hours. Kirlin identified its rates for these items of equipment (which we have found reasonable). The materials (vellum, mylars and blue lines) were estimated as \$252 (which we also find reasonable). R4, COF 1187.

While we believe that calculating the applicable coordination/drafting hours based upon an analysis of actual hours worked, as Kirlin did for this change, should be a more accurate way of calculating those hours applicable to this change and have no reason to question Kirlin's presumption that 80 percent of the actual drafting hours during this period were devoted to this change, there are a variety of flaws in Kirlin's analysis here.

First, Mr. Heroy found, from his review of the documentation, that only 836 labor hours were expended after June 4, 1999, the earliest date Kirlin was notified of this potential change. R4, COF 1172. Since Kirlin does not rebut Mr. Heroy's determination, we find that Kirlin's drafting costs should be based on 80 percent of 836 labor hours, that is, 668.8 labor hours.

Mr. Heroy also states that the claimed hours "do not identify any personnel or job classifications and it is entirely possible that additional duplications exist between drafting labor hours and add-ons," that is, the other personnel in the coordination/drafting department. *Id.* In fact, the supporting documentation showing the actual total coordination/drafting hours for May through August 1999, on which this element of the claim is based, do not indicate that the hours were only for the coordinator. R4, COF 1200. Here too, Kirlin provides no response to Mr. Heroy's observations.

Thus, we will only allow Kirlin the 668.8 coordination/drafting hours applicable to this change, and, because of the potential duplications referenced by Mr. Heroy, we will allocate the

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<sup>463</sup> While Mr. Heroy speculates that the labor rate claimed for the coordinator is too high, R4, COF 1172, we find it fair and reasonable, based upon Kirlin's explanation of this individual's coordination responsibilities. See H.Tr., Hahr, 6:46,122-24.

668.8 hours among the claimed individuals from the coordination/drafting department using the same relative percentages as the estimated hours indicated in Kirlin's change claim. As indicated above, the record shows that the estimated hours of the other individuals in the coordination/drafting department represent 52 percent of the coordinator's hours.<sup>464</sup> R4, COF 1187. Thus, the estimated coordinator's hours represent 65.8 percent of Kirlin's total claimed coordination/drafting hours applicable to this change.<sup>465</sup> Based on the foregoing, we find a reasonable estimate for the coordinator's hours for this change is 440 labor hours,<sup>466</sup> representing \$21,498 in costs for this change.<sup>467</sup> Since Kirlin uses the coordinator's hours as the base to calculate the rest of its coordinator/drafting costs (except for materials), we find Kirlin is entitled to recover these other costs in the same proportion as we allowed the costs for the coordinator, that is, 51.3 percent of its claimed costs for the coordinator,<sup>468</sup> that is, \$14,159.<sup>469</sup> See COF 1187. The \$252 in estimated material costs are also recoverable. *Id.* In sum, we find that Kirlin is entitled to recover \$35,909 for this element of its change claim.<sup>470</sup>

### 8. Field Office Expense

Kirlin claims \$18,649 in field office expenses, which include the hours of the senior project manager, project manager, estimator/engineer and foreman, for costs related to estimating and managing this change order. R4, COF 1188. As discussed above, such management and supervision costs are included in the percentage allowance for overhead and the expense of preparing a cost estimate in response to a government request for a change proposal is not compensable. Thus, Kirlin is not entitled to recover this cost.

### 9. Conclusion

Kirlin is entitled to recover \$213,601 for this change calculated as follows<sup>471</sup>:

Material	\$4,702
Labor	\$122,028
Excavation	\$116,069

<sup>464</sup> 20% (senior coordinator) + 2% (coordination manager) + 10% (computer technician) + 10% (scanning technician) + 10% ("repo." technician) = 52%. See R4, COF 1187.

<sup>465</sup> 1 (coordinator hours)/1.52 (total coordinator/drafting department hours) = 65.8%.

<sup>466</sup> 65.8% of 668.8 labor hours = 440 labor hours.

<sup>467</sup> 440 hours x \$48.86 = \$21,498. See R4, COF 1187.

<sup>468</sup> We allow \$21,498, or 51.3 percent of Kirlin's claimed \$41,883, for the coordinator. See R4, COF 1187.

<sup>469</sup> \$27,600 x .513 = \$14,159.

<sup>470</sup> \$21,498 + \$14,159 + \$252 = \$35,909.

<sup>471</sup> Kirlin also claimed a 1-percent markup for bond costs, which is not recoverable as it is considered to part of the 10-percent overhead markup. R4, K0189.

Coordination/Drafting	\$35,909
<b>Total Direct Costs</b>	<b>\$278,708</b>
Overhead (10%)	\$27,871
Profit (10%)	\$ 30,658
<b>Total Costs with Overhead/Profit</b>	<b>\$337,237</b>
Amount Previously Allowed Kirlin <sup>472</sup>	<\$123,636>
<b>Total Kirlin Recovery</b>	<b>\$213,601</b>

## G. Resize Fans for Air Handling Units, Clark Change Order No. 810150

### 1. Background

Clark has submitted a claim on behalf of Kirlin, Livingston, and Judd based on modifications to the sheaves in five air handling units (AHU) and resizing the fans in four AHUs. R4, 7043-44. These AHUs were installed by Kirlin in the basement of the South Addition. H.Tr., Hahr, 9:47. According to Kirlin, the resizing of the fans caused three of the units to be taller than originally anticipated, *id.* at 9:86-91, and this greater height required that the already installed pipe of Kirlin and Livingston be removed in order to install these AHUs, and then this pipe had to be reconfigured and reinstalled to fit above the AHUs. *Id.* at 9:79-80; R4, COF 1938.

Kirlin's claim here totals \$113,255. This claim included \$13,500 for the modifications and resizing of the AHUs by Trane Company (the supplier of the AHUs). R4, 7047. The bulk of the remainder of Kirlin's claimed costs for this change, including \$20,367 on behalf of its subcontractor United Sheet Metal, were for removing the installed pipe and sheet metal work, and reconfiguring and reinstalling it. R4, 7047, 7150; H.Tr., Hahr, 9:101-04, 117-18, 227; L. Smith, 9:129. United Sheet Metal's claim also includes an additional \$7,999 for modifications to the plenums of the four AHUs because of the different fans and enlarged fan compartments.<sup>473</sup> R4, 7145; H.Tr., L. Smith, 9:127; Hahr, 9:173. Livingston's claim totals \$8,276 for removing and reinstalling fire protection piping for the sprinkler system standpipe. R4, 6915; H.Tr., Sullivan, 10:71. Judd's claim totals \$11,969 for changes in the installation of the electrical conduit caused by the larger sizes of these AHUs. R4, 6972; H.Tr., Mansfield, 10:78, 82-91.

The genesis of this claim was a "clarification notice" (labeled sketch No. RD-M23), which changed the applicable external static pressures for AHUs Nos. 6 through 14. R4, COF 1890; H.Tr., Hahr, 9:58. This sketch was first provided to Kirlin by AOC in response to Kirlin's fourth revision to its AHU submittals. H.Tr., Hahr, 9:59. Kirlin had earlier made three submittals for the AHUs to AOC, the first two of which were rejected and the third revision was "approved as noted, resubmission required" on February 4, 2000. R4, COF 1856; H.Tr., Hahr, 9:27, 46, 53.

<sup>472</sup> As noted above, AOC previously allowed \$136,000 for this change claim. R4, 1191. Subtracting Clark's 10-percent markup on this recovery, Kirlin's share of the previous amount allowed is \$123,636.

<sup>473</sup> Plenums are sheet metal casing exterior to the fan or some other type of equipment. H.Tr., L. Smith, 9:127. The plenum is what comes off the AHU before its gets to the ductwork. *Id.* at 9:159.

At that time (February 4), according to Mr. Hahr, Kirlin had already completed its coordination to ensure that all the piping and utility lines could be installed with the AHUs in the tightly congested South Addition. H.Tr., Hahr, 9:47-51. In this regard, Kirlin had assumed, based on its experience, that the size of the AHUs would not change from the earlier submittals, and Mr. Hahr indicated that nothing in AOC's review of the third submittal changed this assumption. *Id.* at 9:51-52. Moreover, given the nature of AOC's review comments on the third revision to the AHU submittal, Mr. Hahr testified that Kirlin released the AHUs for production by Trane, and determined that the "installation of the piping and sheet metal and the other utilities can . . . commence or continue;" that is, that Kirlin could "start hanging pipe and duct work." *Id.* at 9:52-54.

Kirlin submitted its fourth revision of the AHU submittals on February 16 to respond to AOC's earlier comments. App. Exh. 39; R4, COF 1856. In response to this submission, on March 6, AOC returned the fourth revision, and stated "[f]ans for AHU-6 through AHU-14 have not been selected at the proper external static pressure. See RD-M23 dated 7/8/99."<sup>474</sup> App. Exh. 39 at 3. As noted above, RD-M23 changed the applicable external static pressures for these AHUs. We find that this was the first time Kirlin had been apprised of this revision in the external static pressures, even though this revision had been prepared by DMJM 8 months earlier. H.Tr., Hahr, 9:53, 59.

On March 8, Clark advised AOC that it considered the issuance of RD-M23 to be a change to the contract and that the affected AHUs had been previously released for fabrication based upon AOC's comments on the third revision. R4, COF 1991.

Kirlin, in consultation with Trane, determined that the external static pressure revision could possibly be accommodated by modifications to the sheaves (that is, pulleys that go from the motor to the fan) in the affected AHUs. H.Tr., Hahr, 9:62-63. Kirlin modified its contract with Trane to provide for the modification of the sheaves for these nine AHUs for a price of \$13,500. R4, COF 2042. On March 20, Kirlin submitted to AOC its fifth revision to the AHU submittals, based on the assumption that this issue could be satisfied by modifications to the sheaves; the only basic change in this revision from the fourth revision was to reflect that the external static pressure ratings complied with those specified in RD-M23. App. Exh. 40; R4, COF 1856; H.Tr., Hahr, 9:64-66. This submission was approved by AOC on March 27. App. Exh. 40 at 3; R4, COF 1856.

Mr. Hahr testified that, even before AOC approved the fifth revision, Trane contacted Kirlin and indicated that for AHU Nos. 8, 10, 11 and 13 the revised external static pressure requirements could not be addressed by modifying the sheaves without exceeding the specified noise criteria and the performance ratings of the AHUs, and that there would have to be a new motor selection for the fans on those units and that the heights of these AHUs would change. H.Tr., Hahr, 9:68-69. While Mr. Hahr testified that Kirlin "immediately looked at what that meant to our coordination process and then we notified everybody that there was a much bigger impact than we had previously thought because of this external static pressure increase," *id.* at 9:69, he did

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<sup>474</sup> The external static pressures for these AHUs had not changed from the third to the fourth revisions of Kirlin's AHU submittals. H.Tr., Hahr, 9:55-57.

not testify that he so advised AOC at that time and the record indicates that he did not. In the absence of any evidence to the contrary, we find that Kirlin only first notified AOC of this problem on or about June 22 (almost 3 months later), when Kirlin submitted its sixth revision to the AHU submission showing the different-sized AHU Nos. 8, 10, 11, and 13. *See* App. Exh. 41; R4, COF 1856, 1932.

Meanwhile, as indicated from our review of Clark's Superintendent's Daily Reports during April, May and June, Kirlin installed pipe in the South Addition basement, including in the areas above the affected AHUs and obviously without accounting for the different sized AHUs (given that it subsequently had to remove the piping it installed). *See, e.g.*, C4 Supp. 01 01434 (April 6, 2000); C4 Supp. 01 01263 (May 5, 2000); C4 Supp. 01 01274 (May 12, 2000); C4 Supp. 011216 (June 6, 2000); *see also* R4, Drawing M107 (showing piping to be installed by Kirlin and Livingston above the affected AHUs). Consistent with this record, John Taylor, Kirlin's steam fitter foreman responsible for much of the installation of this pipe, testified that by the time the dimensional changes to the affected AHUs occurred, "all the bigger mains" had been installed in the east and west mechanical rooms in the South Addition basement above where the affected AHUs were located, and that the plumbing had been installed about a month in advance of that. H.Tr., Taylor, 9:210-11; *see* R4, Drawing M107. Clark's Superintendent's Daily Reports also show that Livingston started installing the South Addition basement fire protection water piping on May 15, which it apparently completed by May 26. *See, e.g.*, C4 Supp. 01 01240, 01 01244.

Clark's Superintendent's Daily Reports show that the AHUs were delivered to the site some time prior to June 15 and that Kirlin started moving them into place for installation. *See, e.g.*, C4 Supp. 01 01193, 01 01197, 01 01209. After this delivery, Kirlin prepared the sixth revision of the AHU submittals on June 20, which AOC received on June 23. App. Exh. 41; R4, COF 1856, 1932; H.Tr., Hahr, 9:71. This revision showed that the fans were changed in AHU Nos. 8, 10, 11, and 13 in order to meet the external static pressure requirements imposed by RD-M23, which caused the height of AHU Nos. 8, 10 and 11 to be increased by 10 or 20 inches and for the height of AHU No. 13 to be decreased by 2 inches. App. Exh. 41; H.Tr., Hahr, 9:73-79, 87-91.

Meanwhile, on June 22, Clark advised AOC that the AHUs were being installed, but the AHUs and associated mechanical services would have to be modified in order to comply with RD-M23. R4, COF 1942. Clark again advised AOC that it considered the issuance of RD-M23 to be a change to the contract and requested direction from AOC on how to proceed. *Id.* On June 26, AOC responded that "the changes detailed on RD-M23 were not significant" and "[a]ccordingly, there is no cost associated with" this clarification. R4, COF 1941.

Clark's Superintendent's Daily Reports show that Kirlin and Livingston commenced removing the pipe above the affected AHUs on June 26. C4 Supp. 01 01182, 01184. On July 5, at the owner's meeting, this problem and its impact were discussed. R4, COF 1934-36. On July 17, AOC declined to review the sixth revision because the fifth revision had been approved as it acceptably addressed RD-M23. R4, COF 1898. Kirlin, United Sheet Metal, Livingston and Judd subsequently completed the reconfiguration and installation of the pipe, sheet metal and electrical conduits to fit into the more confined space above the affected AHUs. H.Tr., Hahr, 9:107; L. Smith, 9:135-37; Taylor, 9:213-15; Sullivan, 10:71; Mansfield, 10:86-92.

## 2. Trane Costs

We find that Kirlin is entitled to recover the \$13,500 it paid Trane for reconfiguring the AHUs to satisfy the external pressure requirements imposed by RD-M23. R4, 7047. Contrary to AOC's argument, the record shows that the changes to the external static pressure ratings of the AHUs were significant. *See* H.Tr., Hahr, 9:77. Moreover, the record shows that this change caused the AHUs to be modified by modifying the sheaves on five of the AHUs and changing the fans (and thus the AHU height) in the other four affected AHUs. *See* H.Tr., Hahr, 9:102-03. Trane's initial price of \$13,500 was to address the external static pressure issue on all of the affected AHUs with just the sheave modifications. R4, COF 2042; H.Tr., Hahr, 9:97-98. When it was determined that this solution would not work for four of the AHUs, Trane agreed to provide the AHUs with different fans at the same price. App. Exh. 42; H.Tr., Hahr, 9:102-03. This price is supported by a contract modification to the Kirlin-Trane contract and an invoice from Trane, App. Exh. 42, and we find it fair and reasonable.

## 3. Costs of Removing, Reconfiguring and Reinstalling Pipe and Ductwork

As noted above, the bulk of Kirlin's, United Sheet Metal's and Livingston's change claims are for the costs of removing, reconfiguring and reinstalling the pipe and ductwork to allow the affected AHUs to be installed. We find that these costs are not recoverable.

Clark's contract specifically placed on Clark the duty to coordinate its work among its various subcontractors. That is, Clark was required to "[c]ontinuously coordinate the work of all subcontractors" and to "require each subcontractor to examine work of other trades and all sections of specifications to assure satisfactory installation of, and connection between, [its] work and work of other trades." R4, K0040, K0079. As indicated above, Kirlin's basic claim is that it had previously coordinated how this work would be installed before AOC issued RD-M23, and, based on this coordination, Kirlin, Livingston and United Sheet Metal had proceeded to install the pipe and ductwork.

Crediting Mr. Hahr's testimony that Trane and Kirlin knew by March 27, 2000 that the proposed modification of the sheaves in the affected AHUs would not satisfy the revised external static pressure requirements and that the size of the affected AHU would be changed, the record shows that Kirlin/Clark did not apprise AOC of this fact until after the AHUs were delivered to the site almost 3 months later. *See* App. Exh. 41; R4, COF 1856, 1932. Moreover, even though it knew the size of the AHUs would be changed, Kirlin allowed the installation of pipe and sheet metal, without first determining the new sizes of the AHUs and coordinating how the pipe could be fit in the confined area above the affected AHUs.

Under such circumstances, we find that Kirlin did not give adequate notice to AOC that the approved solution to satisfy the external static pressure change, which it proposed in the fifth revision to its AHU submittal, would not work. Clark's March 8, 2000 notice that it considered RD-M23 to be a change did not provide AOC with sufficient notice because this notice was given before Kirlin submitted the fifth revision, which AOC accepted. *See* R4, COF 1991; App. Exh. 40. This failure obviously prejudiced AOC, inasmuch as the notice was only given

after the AHUs were delivered to the site and the affected piping installed, which did not allow AOC to ascertain whether, in fact, the external pressure static requirements could be met without enlarging the size of the AHUs or to consider whether Kirlin should be installing pipe in the South Addition basement before the issue of the size of the AHUs was resolved.

In addition, Kirlin's failure to give timely notice to AOC of this issue, while continuing to install pipe that ultimately had to be removed, did not satisfy Kirlin's duty to mitigate its costs in implementing the change, and precludes the recovery by Kirlin and the other subcontractors (United Sheet Metal and Livingston) of the costs that were incurred in installing, reconfiguring and reinstalling the pipe and ductwork caused by Kirlin's failure to resolve this issue before installing the affected pipe and ductwork. *See Calfon Constr. Inc. v. United States*, 18 Cl. Ct. 426, 439-41; *Ling-Temco-Vought, Inc. v. United States*, 201 Ct. Cl. 135, 145-50, 475 F.2d 630 (1973); *Powers Regulator Co., supra*, at 71,321; *Gulf & Western Industries, Inc.*, ASBCA No. 18406, June 29, 1979, 79-2 BCA ¶ 13,960 at 68,523. In this regard, Kirlin's means of implementing the change imposed by RD-M23 can hardly be said to be those of a prudent contractor acting within its experience and capabilities.<sup>475</sup> *See Lamb Eng'g & Constr. Co., supra*, at 145,346.

While it may be that the larger sized AHUs made it more costly to install the piping and ductwork within the confined area of the South Addition basement, Kirlin, United Sheet Metal, and Livingston have not presented their change claims on the basis of the difference between what it would have cost to install this pipe and ductwork, and what it did cost to install it in the more confined area. If Clark and its subcontractors had re-coordinated the installation of the piping and ductwork in March 1999, when it was assertedly discovered that the AHUs would be taller, instead of simply installing pipe in accordance with the originally coordinated plan, it may be that any difference in installation costs would have been mitigated. On this record, because we can only speculate about the cost impact if this issue had been promptly reported to AOC and the work re-coordinated in March, instead of June (after the AHUs had been delivered to the site and the pipe installed), we find no basis to allow recovery of any of Kirlin's, United Sheet

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<sup>475</sup> It may well be that Mr. Hahr's recollection of when he became aware of the fact that the height of these AHUs would have to be changed to address the external static pressure issue was faulty, given the obvious imprudence of installing pipe that Kirlin (a very experienced mechanical and plumbing contractor) knew or should have known may well have to be removed because of the change in height of the AHUs. But for Mr. Hahr's testimony, the record otherwise suggests that Kirlin became aware of this issue on or about June 15 when the AHUs were delivered to the site, which would suggest that Trane either did not earlier discover, or communicate to Kirlin its discovery, that the height of these AHUs had to be increased. In this regard, no Trane witness appeared at the hearing, and the record is remarkably devoid of any evidence from Trane addressing this issue, including when or how it was discovered that adjusting the sheaves would not allow some of the AHUs to meet the revised external static pressure requirement. However, even assuming that this problem was first discovered in June and then immediately reported, Kirlin and the other subcontractors still would not be entitled to recover the costs of installing, reconfiguring and reinstalling the affected pipe, given Kirlin's submission of the fifth revision of the AHU submittals, indicating that the height of the AHUs did not have to change, which AOC had approved almost 3 months earlier, and the absence of any explanation as to why it took so long for Trane or Kirlin to discover or communicate that this solution would not work.

Metal's or Livingston's claimed costs here for the removal of the installed pipe and ductwork, and the reconfiguration and reinstallation of this pipe and ductwork.<sup>476</sup>

#### 4. United Sheet Metal Claim for Modifying AHU Plenums

As noted above, United Sheet Metal's claim includes \$7,999 for modifications to the plenums on the four AHUs whose height was changed because of the new fans. R4, 7145. This claim is based on estimated, not actual, costs. H.Tr., L. Smith, 9:131. According to Mr. Smith, these costs were for disassembling the factory delivered Trane AHUs, cutting down the plenums and reassembling the AHUs. *Id.* at 9:130-31, 151, 154. According to Mr. Hahr, these modifications to the AHUs were to address the greater height of the AHUs caused by the greater size of the fan enclosures on the units. H.Tr., Hahr, 9:172-74.

AOC asserts that this claim should be denied because it not based on actual costs, but on unsupported estimated costs. AOC's PFF part 3, tab I, at 3-4. As noted above, estimates of a contractor's costs may be used where actual cost data is not available. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321. Such estimates should be prepared by competent individuals with adequate knowledge of the facts and circumstances, and the testimony of individuals familiar with the facts is helpful in verifying the validity of estimates. *Id.*

While the record evidences that United Sheet Metal incurred costs as a result of this change, we deny its claim here because it has not established that the estimate was prepared by competent individuals or the reasonableness of its estimated costs. Mr. Smith, the president of United Sheet Metal, testified on that firm's behalf, but was not personally responsible for pricing or reviewing the pricing of change proposals because United Sheet Metal has a "change order department that does that." H.Tr., L. Smith, 9:123. While Mr. Smith provided detailed reasons why United Sheet Metal uses estimated costs for its change proposals, which are generally accepted by its customers for purposes of negotiation,<sup>477</sup> *id.* at 131-34, Mr. Smith's testimony addressed, in only the broadest sense, the elements of the change claim here, basically reading without comment the titles of some of the change claim elements. *Id.* at 131. Mr. Smith did not testify as to reasonableness of the estimated labor hours, or as to the basis for the mark-ups on the labor costs for material costs or the overhead rate. Mr. Smith's testimony also indicated that he did not have personal knowledge of exactly what was entailed by the change or the basis for the cost estimates in the change. *See id.* at 9:150-58; H.Tr., Hahr, 9:168-71. Under such circumstances, Appellant has not met its burden of establishing the reasonableness of United Sheet Metal's claimed costs.

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<sup>476</sup> Kirlin's claim included material costs, labor costs, equipment rental costs, drafting costs, and other costs. All of these claimed costs relate to the removal, reconfiguration and reinstallation of the piping above the affected AHUs. To the extent the other costs claimed, which include the costs for the senior project manager, project manager, estimator/engineer, and foreman related to estimating the work and managing the work, are for work not related to the removal, reconfiguration and reinstallation of the affected piping, as discussed above, such management and supervision costs are included in the percentage allowance for overhead and the expense of preparing a cost estimate in response to a government request for a change proposal is not compensable.

<sup>477</sup> Mr. Smith did testify that the practice of using estimated rather than actual hours has precluded United Sheet Metal from settling changes on some federal government jobs. H.Tr., L. Smith, 9:133.

Mr. Smith's conclusory testimony that he believes the total estimated amount is a fair and reasonable cost for the changed work does not meet this burden.<sup>478</sup> H.Tr., L. Smith, 9:140. Thus, we find that United Sheet Metal cannot recover these claimed costs.

### 5. Summary of Kirlin Claim

Kirlin is entitled to recover \$16,335 for this change computed as follows:

Trane Costs	\$13,500
Overhead (10%)	\$1,350
Profit (10%)	\$1,485
<b>Total</b>	<b>\$16,335</b>

### 6. Judd's Claim

Judd claims \$11,969 for changes in the installation of the electrical conduit caused by the larger sizes of these AHUs. R4, 6972. Judd's claim is based upon the installation of 206.09 feet of electrical conduit as a result of this change, which claim amount was calculated using the NECA rates for the material and labor hours as well as Judd's actual labor rates. *Id.*; H.Tr., Mansfield, 10:105-06. The claim also includes Judd's allowable overhead and profit markups. R4, 6972.

These claimed costs were supported by the testimony of Mr. Mansfield, who was accepted by the Board as an expert "to audit Judd's scope of work as well as [its] costs," H.Tr., Mansfield, 1:89, and who had personal knowledge of this claim (including actually witnessing the changed work being done). *Id.* at 10:76, 97. According to Mr. Mansfield, unlike the other site work caused by this change, Judd had done "very minimal" electrical duct installation work in this area when the installed pipe and ductwork had to be removed because of the change in height of the AHUs. *Id.* at 10:100. This was so because the electrical conduit was to be installed below the pipe and ductwork that had to be removed and reinstalled, and Judd's claim did not include significant costs for removal of installed work. *Id.* at 10:77-78, 86, 100. Mr. Mansfield analyzed the impact of the changed work by use of the as-built electrical drawings, which he prepared for Clark. *Id.* at 10:83; App. Exh. 44. Using the as-built electrical drawings for the South Addition basement, Mr. Mansfield testified in detail about the very confined area in the South Addition basement, that the changes in the size of the AHUs no longer allowed the electrical conduit to be installed as planned above the affected AHUs, and that major detours in the installation of the electrical conduit had to be made around the congested areas as a result of this change. H.Tr., Mansfield, 10:78-91, 97-98. Mr. Mansfield also reviewed Judd's claim and found that its labor and material estimates were conservative and understated, given the extensive amount of detours required by this change in the size of the AHUs. *Id.* at 10:93, 100-01, 105.

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<sup>478</sup> We note that for the same basic reasons we deny United Sheet Metal's claim here, we would have denied Livingston's claim, even if it was otherwise allowable. This is so because here too Clark failed to provide sufficient evidence that the estimated costs for the change were fair and reasonable. The only evidence presented was Mr. Sullivan's conclusory testimony that he went over the estimates in detail with Livingston's representatives and found they were fair and reasonable, with no reasons or analysis as to why he believed this was the case. H.Tr., Sullivan, 10:69-72.

While AOC asserts that we should deny Judd's claim because it is based on estimated costs, Clark has met its burden of establishing the reasonableness of Judd's estimate as a measure of its damages resulting from this change, based upon the expert and persuasive testimony of Mr. Mansfield. Thus, we find Judd is entitled to recover \$11,969 for this change.

#### **H. Palm House Finned Tube Rerouting, Clark Change Order No. 810324.**

Clark claims \$5,430 for providing supports for the finned tube radiation system in the Palm House, H.Tr., Sullivan, 10:27; R4, COF 3440, and Kirlin claims \$42,427 for rerouting the finned tube radiation system in the Palm House. H.Tr., 9:243. While these two claims involved alleged constructive changes on the same section of finned tube radiation system in the Palm House, they are otherwise not related to each other because both items of work had to separately be done. See H.Tr., Taylor, 9:291-92.

##### **1. Finned Tube Radiation Support**

With regard to Clark's \$5,430 claim for providing supports for the finned tube radiation system in the Palm House, this issue was resolved above in Clark Change Order No. 810401 above, where we found that it was Clark's responsibility under the contract to install the finned tube radiation system by attaching it to the building structure. Thus, we deny this change claim.

##### **2. Rerouting of Piping for Finned Tube Radiation**

Kirlin's portion of this change claim arose from its discovery in March 2001, while installing the finned tube radiation system towards the top of the Palm House, that the pipe could not be installed as indicated on the drawings because of existing steel plates on the trusses. H.Tr., Hahr, 9:249. These trusses with the steel plates were in existence when the contract was awarded, although AOC does not claim, and we do not find, that the conflict of the steel plates with the specified location of the finned tube radiation system was a patent defect of which Clark should have been aware when it submitted its proposal. R4, 3394, 3395.

When he became aware of the problem, Mr. Taylor of Kirlin wrote a "notice and request" that formed the basis for RFI No. 687 dated March 26, 2001 to AOC concerning this issue. R4, 10848-50. Mr. Taylor's notice and request stated:

There is an existing steel plate on truss at the elevation of new steam radiators prohibiting the piping running unit to unit as shown on plan. Suggest piping supply and trap assemblies for each section between trusses.

R4, 10850; H.Tr., Taylor, 9:278. Mr. Taylor attached a sketch illustrating the proposed solution. R4, 10851. As described by Mr. Hahr:

Because we can't run through the steel p[late], John [Taylor] suggested fix to the problem is we have a separate steam supply line with a separate control valve for

one and a separate draft dumping back into the return for each one basically adding a steam valve, adding a steam trap.

H.Tr., Hahr, 9:251; *see* R4, 10851 (as marked by Msrs. Hahr and Taylor). This same problem and fix occurred at nine separate trusses in the Palm House. H.Tr., Hahr, 9:256-58. On March 27, AOC responded that the proposed solution was "acceptable." R4, 10847. Kirlin then implemented the proposed fix. The parties have stipulated that the amount that would be due Kirlin if this change claim is allowed is \$42,427. H.Tr., 9:243.

AOC asserts that this claim cannot be considered a change or constructive change because AOC did not direct this work, but only stated that Kirlin's proposed approach was acceptable. Resp. PFF, part 3, tab III, at 1.

We find the contract requirement for the installation of the finned tube radiation system at a level where the steel plates would not allow for installation as required to be a defective specification. The government bears the responsibility for defects in its design specifications, *White v. Edsall Constr. Co., Inc.*, 296 F.3d at 1085-86, and the additional efforts incurred by a contractor to overcome defective design specifications constitute constructive changes. *Hol-Gar Mfg. Corp., v. United States*, 175 Ct. Cl. at 523. This was not a problem that could have been resolved by earlier coordination of the drawings as suggested by the contracting officer's decision. COD, Palm House Finned Tube Rerouting. In fact, Mr. Taylor persuasively testified, without rebuttal, that the location of the finned tube radiation system could not be lowered to avoid the steel plates because the primary purpose of this finned tube radiation at this location was for snow and ice melt, and that there was no other solution to this problem barring cutting into the steel plate. H.Tr., Taylor, 9:276-78.

Based on the foregoing, we find that Kirlin is entitled to recover \$42,427 for this change claim.

#### **I. Wall Hydrants at Orangerie Roof, Clark Change Order No. 810111**

Kirlin seeks \$16,672 for additional wall hydrants at the Orangerie roof and hose bibs in the mezzanine mechanical room as a result of a change issued by AOC on November 15, 1999. R4, COF 4102; App. Exh. 29; H.Tr., Hahr, 6:30. Kirlin initially submitted a claim for \$32,860 for this change on January 10, 2000. R4, COF 4089. On February 2, Clark forwarded this claim to AOC, with Clark's markup, for a total \$35,092. R4, COF 4087-88. On February 22, AOC identified a variety of flaws in Kirlin's claim and found, based on its own estimate, that \$5,340 (\$4,853 for Kirlin) was a fair and reasonable price for this change, and issued a contract modification implementing this determination. R4, COF 4080-81, 4083; COD, Wall Hydrants at Orangerie Roof. Mr. Hahr testified that he believed that AOC made a number of valid points in the February 22 letter and, on April 11, 2000, Kirlin submitted a revised claim for this change in the amount of \$16,672 to Clark. H.Tr., Hahr 6:51, 53; App. Exh. 29. AOC was never provided a copy of this revised claim prior to the issuance of the contracting officer's decision on this change claim (or apparently prior to the hearing). H.Tr., Metzler, 6:226.

The only issue in this claim is quantum. Kirlin's revised claim is based upon estimated costs and includes the following direct costs:

Material Costs	\$3,678
Labor Costs	\$7,008
Equipment Costs	\$605
Coordination/Drafting Costs	\$1,237
Field Office Expense	\$615
Subcontract Costs	\$500

App. Exh. 29 at 2. The claim also included the 10-percent markups for overhead and profit and a 1 percent markup for bond costs. *Id.*

### 1. Material Costs

Kirlin's total estimated material costs for this change were \$3,678 consisting of three elements: \$2,856 for the enumerated materials, \$550 for core drilling, and \$272 for markups on the material for drayage and warranty. App. Exh. 29 at 3.

The \$2,856 is the estimate for 26 different types of materials, as determined by Kirlin's takeoff analysis, including such items as pipe, hangers, elbows, reducing tees, couplings, adapters, clamps, sleeves, hydrants, and hose bibs. *Id.* at 10. This estimate identified the type, estimated quantity and unit price for each of these items of material in calculating the total estimated material costs. *Id.*

AOC/DMJM prepared an estimate of this change using the Means Guide, in which it estimated material costs at \$1,440, consisting of 5 different types of materials: (1) one-inch type L copper tube, (2) three-quarters-inch type L copper tube, (3) hydrants, (4) hose bibs, and (5) miscellaneous fittings. R4, COF 4080, 4083.

Just before the hearing, Mr. Hahr (an expert in piping pricing) performed another takeoff analysis to determine the materials implicated by the change, in which he compared the material estimates of Kirlin and AOC. App. Exh. 30; H.Tr., Hahr, 6:57. At the hearing, he detailed and illustrated his takeoff analysis of the materials used in this change and compared the differences between Kirlin's and AOC's estimates. H.Tr., Hahr, 6:59-85; R4, Drawings P101, P102, P103, COF 4108-12 (as marked by Mr. Hahr). He identified what he perceived to be the flaws in AOC's material estimate and explained why Kirlin's material estimate was accurate, with one exception (explained below).

Many of the apparent omissions in AOC's estimate were because of the different methodologies of the MCAA Manual, where all material components implicated by the change are listed and priced, and the Means Guide, where not all components are listed but some are considered included with listed pipe, for example, hangers and joints. H.Tr., Hahr, 6:68-69, 82-83. Mr. Hahr also pointed to various components not included in AOC's estimate, such as "reducing Ts," adapters, riser clamps, and sleeves that were required for this change. *Id.* at 6:71 75, 83-85.

There were also differences in the pipe length quantities in the estimates. Through his takeoff analysis, Mr. Hahr verified the accuracy of Kirlin's 350 lineal feet of one-inch copper tube (as compared to AOC's estimated 300 lineal feet), but determined that Kirlin's 120 lineal foot estimate for three-quarters-inch copper tube was overstated and should be 60 lineal feet (as compared to AOC's estimated 40 lineal feet). *Id.* at 6:58-67, 175. AOC's offered no rebuttal to Mr. Hahr's takeoff analysis, which we find adequately supports Kirlin's claim (as adjusted below to account for the lesser amount of three-quarters-inch copper tube).<sup>479</sup>

The prices for the hydrants and hose bibs included as material were based upon an actual quote from a material supplier, which Mr. Hahr recalled he verified as the price Kirlin was going to have to pay for these items and which was in fact paid. App. Exh. 29 at 11; H.Tr., Hahr, 6:75-77, 176-77. While a paid invoice would have been better evidence here, we credit Mr. Hahr's memory and find Kirlin has produced sufficient evidence that Kirlin paid a fair and reasonable price for these materials.

The estimated unit prices for the rest of the materials in Kirlin's estimate were derived from the Harris National Mechanical Estimator. H.Tr., Hahr, 6:179-81, 9:112. As discussed above, in the absence of countervailing evidence, we have no basis to determine these unit prices are not a reasonable estimate for this material. While AOC's different material price estimates are derived from the Means Guide, we accept Kirlin's price estimates here, given the omissions pointed out by Mr. Hahr in AOC's estimate.

Kirlin offered no testimony concerning the \$550 in core drilling material costs, which are described in the proposal as follows: "Core Drilling 2" Hole/Travel, Core-Min. Charge." App. Exh. 29 at 3. While this description is vague, the record otherwise evidences that AOC recognized that a single 2-inch diameter drill would be required for this change; that although AOC's estimate included no costs for this item, AOC did not specifically take exception to this charge that was included in Kirlin's initial proposal; and that Kirlin's cost proposal does not otherwise contain costs for core drilling. *Id.*; R4, COF 4080, 4083. Under the circumstances, we find Kirlin may recover these costs.

The \$272 in markups on the material for drayage and warranty are not allowable for the reasons stated above.

In sum, Kirlin is entitled to recover \$3,317 in material costs for this change.<sup>480</sup>

## 2. Labor Costs

Kirlin's change claim includes \$7,008 in labor costs, including \$5,794 in craftsman labor costs. App. Exh. 29 at 5. The labor costs are based on the 141.34 craftsman labor hours, which were

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<sup>479</sup> Although Mr. Murphy (an expert in piping pricing), who prepared the AOC/DMJM estimate, was present during this portion of the hearing, he offered no rebuttal testimony with regard to this change claim.

<sup>480</sup>  $\$3,678 - \$89$  (60 lineal feet x  $\$1.49$  (App. Exh. 29 at 10)) to account for the 60-foot pipe length miscalculation included in the material estimate) -  $\$272 = \$3,317$ .

determined based upon the foregoing material takeoff and the MCAA Manual. *Id.* at 5, 10. In the absence of specific challenges to this estimate by AOC, we will use it as the basis to determine the amount of labor costs that Kirlin should recover for this change.

We first subtract 3.6 hours from the claimed 141.34 hours to account for the pipe miscalculation in Kirlin's estimate, which results in a total 138 craftsman hours for this change.<sup>481</sup> Kirlin's claimed craftsman hourly rate here is \$40.99, which we discount by 10 percent to account for the apparent overstatement in Kirlin's craftsman rate for not accounting for its use of apprentices, to \$36.89 per hour.<sup>482</sup> *See id.* at 5. We thus allow \$5,091 of Kirlin's claimed \$5,794 craftsman labor costs.<sup>483</sup>

Here, Kirlin used a 15-percent rate, rather than a 10-percent rate, to calculate its unproductive foreman hours. App. Exh. 29 at 5. As indicated above, in the absence of evidence to the contrary, we find no basis for more than 10-percent unproductive foreman hours, that is, here 14 hours rather than the 21 hours claimed, and find Kirlin is entitled to recover \$649 (rather than the \$982 claimed) in foreman labor costs.<sup>484</sup> *Id.* Finally, for the reasons detailed above, we find no basis to allow recovery of the \$232 in claimed quality control and safety hours. *Id.*

In sum, we find Kirlin is entitled to recover \$5,740 in labor costs for this change.<sup>485</sup>

### 3. Equipment Costs

Kirlin claims \$605 in equipment costs for this change. The equipment included were a demo hammer, drill motor, electric hammer, gang box, hydro test pump, portaband, pipe stand, radio, sawzal and tank cart quoted at Kirlin's internal rates for 8 days. App. Exh. 29 at 4. These costs were not included in AOC's estimate. Mr. Hahr explained that the tool use was a factor of the number of labor hours devoted to this change. H.Tr., Hahr, 6:192. Based on Mr. Hahr's testimony, we find these costs to be fair and reasonable and recoverable by Kirlin for this change. *Id.* at 6:89, 192-94.

### 4. Coordination/Drafting Costs

Kirlin claims \$1,237 in coordination/drafting costs for this change. For this change claim, according to the form used by Kirlin, the claimed coordinator's hours were supposed to be estimated as 10 percent of the total labor hours, with the senior coordinator's hours as 20 percent

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<sup>481</sup> We arrive at the 3.6 labor figure by multiplying the labor unit price of \$.06 for the three-quarters-inch pipe by the 60 linear feet of this pipe that was overstated in Kirlin's claim. *See* App. Exh. 29 at 10. We then subtract the 3.6 hours from the claimed 141.34 hours to determine an estimated 137.74 labor hours applicable to this change, which we round to 138 labor hours.

<sup>482</sup>  $\$40.99 - \$4.10$  (10% of \$40.99) = \$36.89.

<sup>483</sup>  $\$36.89 \times 138$  labor hours = \$5,091.

<sup>484</sup>  $14 \times \$46.36$  = \$649.

<sup>485</sup>  $\$5,091 + \$649$  = \$5,740.

of the coordinator's hours, the coordination manager, computer technician, scanning technician, and "repo." technician as 10 percent of the hours. The coordination/drafting equipment was also calculated based upon a percentage of the coordinator's labor hours, with a computer/monitor as 100 percent, a vidar scanner/computer/monitor and a document plotter as 10 percent, and a plotter and blue prints as 5 percent, of the coordinator's estimated hours; no coordination/drafting material costs were claimed. App. Exh. 29 at 6.

Here, Kirlin estimated the coordinator as 15.26 hours, which apparently was an error as it was not 10 percent of the 168 claimed labor hours. *Id.* at 5-6. As indicated above, we find a reasonable labor estimate for this change is 152 hours.<sup>486</sup> As discussed above, we have found reasonable Kirlin's methodology for estimating coordination/drafting costs based upon the coordinator's hours, which are in turn determined as a percentage of labor hours. Thus, accepting Kirlin's determination here that the coordinator's hours should be 10 percent of the labor hours for this change, this results in an estimated 15.2 coordinator hours,<sup>487</sup> which is very close to the 15.26 figure used by Kirlin in its coordination/drafting estimate. *Id.* at 6. Because the other estimated drafting/coordination costs flow from the coordinator's hours, we find this element of Kirlin's change proposal to be recoverable in the amount claimed.

#### 5. Field Office Expense

Kirlin's claims \$615 of project manager and foreman labor hours associated with managing and estimating the change order. *Id.* at 7. As discussed above, these costs are not allowable as they are covered by the overhead allowance and because the costs of estimating a change are unallowable.

#### 6. Subcontract Costs

Kirlin's claims \$500 for the estimated cost of water treatment. *Id.* at 8. In response to Kirlin's initial claim, AOC stated, "[I]t is unclear to us what necessitates a \$500 water treatment charge." R4, COF 4080. Kirlin still has not explained the purpose of this charge. Consequently, it is not entitled to recover these costs.

#### 7. Summary

In sum, Kirlin is entitled to recover \$8,335 for this change, calculated as follows:<sup>488</sup>

Material Costs	\$3,317
Labor Costs	\$5,740
Equipment Costs	\$605

<sup>486</sup> 138 craftsman hours + 14 foreman hours = 152 labor hours.

<sup>487</sup> 10% of 152 = 15.2.

<sup>488</sup> As discussed above, Kirlin's claim for bond costs is denied because it is included in the overhead allowance. R4, K0189.

Coordination/Drafting Costs	\$1,237
<b>Subtotal</b>	<b>\$10,899</b>
Overhead (10%)	1,090
Profit (10%)	\$1,199
<b>Subtotal</b>	<b>\$13,188</b>
Less Previous Amount Allowed	<\$4,853>
<b>Total Recoverable</b>	<b>\$8,335</b>

#### J. Extended Steam Piping, Clark Change Order No. 810384

Kirlin claims \$21,099 in costs for the replacement of 63 feet of existing steam and pump condensate lines as well as a copper line from the existing sump pump to the nearest floor drain in the steam room.<sup>489</sup> H.Tr., Hahr, 10:116-17, 120-01; Taylor, 10:136, 139, 143. All of this replaced pipe was located outside the building, and ran from the connection or tie in point, where the steam and pump condensate pipe installed under the contract is to connect (approximately 5 feet outside the building), to a steam vault (located approximately 30 feet outside the building). H.Tr., Hahr, 10:114-18; R4, 11837 (as marked by Mssrs. Hahr and Taylor). The contract did not contemplate that this existing pipe would be replaced. H.Tr., Hahr, 10:115.

According to Mr. Taylor of Kirlin, in the October 2000 timeframe, when the connection of the contract steam and pump condensate pipe to the existing pipe outside the building was attempted, it was discovered that the existing pipe was fatigued, decrepit and “no good.” H.Tr., Taylor, 10:134-36. Consequently, Mr. Taylor contacted Mr. DeGarmo, the “inspector on the job” and an independent contractor employed by DMJM, who, because this work needed to be accomplished as quickly as possible, verbally authorized Kirlin to remove the existing pipe and replace it.<sup>490</sup> *Id.* at 10:134-38. Mr. DeGarmo indicated that this would be considered extra work. *Id.* at 10:137. In reliance upon Mr. DeGarmo’s direction, Kirlin performed this work in the October timeframe. *Id.* at 10:135, 138, 143. Although Mr. Taylor testified that Mr. DeGarmo stated that he would get with AOC to let it know what Kirlin was doing, *id.* at 10:138, there is no written documentation in the record showing that this was done, or that AOC or DMJM specifically ordered or authorized this work, although we have no reason not to credit Mr. Taylor’s credible account of the asserted change.

At about the same time (on September 25, 2000), by Change Order No. 142, AOC directed Clark to furnish and install a valve(s) on the steam and condensate piping in order to control the steam lines from inside the building instead of “going to the main office.” Resp. Exh. 11; H.Tr., Hahr, 10:127-28; Taylor, 10:150-52. The valve(s) was installed by Kirlin on the steam and condensate piping inside the building pursuant to the contract that connected to piping discussed above that

<sup>489</sup> The parties have agreed that \$21,099 is the amount due Kirlin if this change claim is allowed. H.Tr. 10:108.

<sup>490</sup> Mr. DeGarmo was not a witness at the hearing.

Kirlin replaced.<sup>491</sup> H.Tr., Taylor, 10:152-153. The valve(s) was installed about a week after the pipe was replaced. *Id.* at 10:153.

On October 24, Kirlin submitted to Clark two different claims, one in the amount of \$3,974 for the required valve work and one in the amount of \$25,995 for the replacement of the piping located outside the building. Resp. Exh. 11 at 10; R4, COF 4237. On February 27, 2001, Clark submitted to AOC the Kirlin claim for the valve work with Clark's 10-percent markup, for a total claim of \$4,371. Resp. Exh. 11 at 1-2. Clark did not submit Kirlin's claim for the replacement of the piping outside the building to AOC at that time.

In mid to late March 2001, Change Order No. 142 was the subject of negotiations between Clark represented by Jim Reed and AOC represented by Mr. Coffey of DMJM.<sup>492</sup> H.Tr., Coffey, 10:156-57. With respect to these negotiations, Mr. Coffey testified:

During the negotiations, I was informed that there were some additional pipe that had to be installed because it was corroded, and as I recall, it was Mr. Reed. And he said that Kirlin had to install some additional pipe, and I said well, you know, how much are we talking about? So we came to an agreement that it was worth a total of - the original proposal was [\$4,371] for the valves, and we raised the settled amount to [\$4,807], to include that additional pipe.

*Id.* at 10:157-58. Consistent with this testimony, Mr. Coffey prepared a Summary of Negotiations, dated March 27, 2001 stating:

The Botanic Garden staff requested that an additional 6" valve be installed on the incoming service. This would allow them to switch between the two lines entering the building. During the tie-in we discovered that several feet of the existing pipe was corroded beyond use and had to be replaced. This was not included in the original estimate of \$4,371.

The Contractor's estimate of \$4,807 [sic, Mr. Coffey obviously meant \$4,371] was negotiated to a total of \$4,807 which includes all additional work.

Resp. Exh. 12.<sup>493</sup> The parties' agreement was implemented in Supplemental Agreement No. 77, which was executed by Brian Dylus of Clark and Joe Metzler of AOC, whereunder AOC agreed to increase Clark's contract price by \$4,807 for the changed work. Resp. Exh. 10. This

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<sup>491</sup> It is not clear from the record whether a single or multiple valve(s) were required by Change Order No. 142.

<sup>492</sup> Kirlin had no representative at these negotiations.

<sup>493</sup> There is another note in AOC's backup documentation for this supplemental agreement stating, "Kirlin ran additional pipe not shown on Drawing for tie in. Talked with field foreman John Taylor. Kirlin did a little extra work that did [not] show in proposal." This note also documented that Clark was paid an additional \$437 to cover work of replacing the decrepit pipe, besides the \$4,370 for the valve change work. Resp. Exh. 11 at 2.

agreement "referenced" Change Order No. 142, and described the change under the blank for "Description of the Change" as "Modification to Steam Tie Connections at Service Entry." *Id.* This agreement further provided:

In consideration of the modification agreed to herein as complete equitable adjustment, the contractor hereby releases the Government from any and all liability under this Contract for further equitable adjustments attributable to such facts or circumstances giving rise to this Supplemental Agreement. Except as provided herein, all terms and conditions of the Contract remain unchanged and in full force and effect, per the attached release.

*Id.*

Clark finally forwarded Kirlin's change claim for the replacement of the pipe located outside the building to AOC on June 18, 2001. R4, COF 4235. The record shows that AOC apparently believed that this claim was encompassed in Supplemental Agreement No. 77, R4, 11819, and the claim was denied by AOC as unsupported. COD, Extended Steam Piping. AOC asserts here that Clark/Kirlin's claim should be denied because Supplemental Agreement No. 77 encompassed this claim. Resp. PFF, part 3, tab 5, at 2-4. We agree.

An accord is reached when one party agrees to supply or perform and the other party agrees to accept, in settlement or satisfaction of an existing claim something other than that which was actually due and a satisfaction is the actual execution and/or performance of the agreement. *W&F Bldg. Maint. Co., Inc. v. United States*, 56 Fed. Cl. 62, 66 (2003). "In its most common form, an accord and satisfaction exists as 'a mutual agreement between the parties in which one pays or performs and the other accepts payment or performance in satisfaction of a claim or demand which is a bona fide dispute.'" *Id.*, citing, *O'Connor et al. v. United States*, 308 F.3d 1233, 1240 (Fed. Cir. 2002). There are four necessary elements to execute a valid accord and satisfaction: (1) proper subject matter, (2) competent parties, (3) meeting of the minds of the parties, and (4) consideration. *O'Connor et al. v. United States*, 308 F.3d at 1240. AOC bears the burden of persuasion that an accord and satisfaction exists here. *W&F Bldg. Maint. Co., Inc. v. United States*, 56 Fed. Cl. at 66.

We find AOC has met that burden. In this regard, we find Mr. Coffey's un rebutted explanation of the agreement to be persuasive and supported by the record.<sup>494</sup> We also note that while Kirlin's counsel indicated in his closing arguments on this change at the hearing that he did not believe that AOC met its burden of showing an accord and satisfaction, H.Tr., 10:178-82, Clark did not join in its subcontractor's argument or respond in its post-hearing briefs to AOC's assertion that this claim was included in Supplemental Agreement No. 77. While Kirlin's counsel also suggested that there may not have been a meeting of the minds because Mr. Coffey did not know how much pipe was involved in the change when this agreement was made with Clark, *id.* at 10:175, the fact is that Kirlin was not represented in these negotiations and AOC's contract here was with Clark, which had been apprised of the extent of Kirlin's claim, yet chose to not communicate the extent of this Kirlin claim to AOC at the time of these negotiations and

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<sup>494</sup> Mr. Reed of Clark was not called as a witness.

to agree to settle this claim for a far lesser sum than claimed by Kirlin. Under such circumstances, given the absence of any evidence concerning Clark's position on this matter, we believe the supplemental agreement, Mr. Coffey's testimony, and the supporting documentation evidences a meeting of the minds between AOC and Clark. See *Green Mgmt. Corp. v. United States*, 42 Fed. Cl. 411, 436-440 (1998). We find that AOC has shown that each of the four elements of a valid accord and satisfaction have been satisfied here.<sup>495</sup> Thus, Kirlin is not entitled to recover for the costs of this asserted change.

**K. Rain Leaders in Palm House, Clark Change Order No. 810400**

Kirlin claims \$20,209 for installing rain leaders at the gutters on the north side of the east and west Palm House crickets to run down the Palm House columns and below grade to tie into existing storm drain piping. R4, 11941, 11952. AOC and Kirlin both considered this work to be a contract change. H.Tr., Hahr, 7:30; R4, 11952. Based on an estimate by Mr. Coffey of DMJM, AOC determined in the contracting officer's decision on this change claim that Clark/Kirlin was entitled to \$7,086 for this change. H.Tr., Coffey, 7:79; COD, Rain Leaders in Palm House. As indicated above, no payments have been made based upon the contracting officer's decision, so the contracting officer's decision on this claim will not be considered in determining the amount recoverable. H.Tr., 7:116-17. The dispute here concerns only the amount Kirlin is due for this change. Kirlin's claim includes the following specific elements:

Material Costs	\$2,513
Labor Costs	\$12,464
Equipment Costs	\$315
Coordination/Drafting Costs	\$1,189
Other Costs	\$220
<b>Subtotal</b>	<b>\$16,701</b>
Overhead (10%)	\$1,670
Profit (10%)	\$1,837
<b>Total</b>	<b>\$20,209</b>

R4, 11942.

**1. Material Costs**

Based upon a takeoff analysis and the Harris National Mechanical Estimator, Kirlin estimated \$2,513 in material costs, which included quantities of 4-inch "no hub" cast iron pipe, hangers, one-quarter bends, one-eighth bends, core drill, link seal pipe, wye, Tyler couplings and Fernco couplings, which total \$2,280, as well as \$233 in markups based on the material costs for drayage and warranty. H.Tr., Hahr 7:38, 43, 10:177; R4, 11942.

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<sup>495</sup> It is well established that the forum will inquire only into whether there has been a bargained-for exchange, and not into the adequacy of consideration. *Green Mgmt. Corp. v. United States*, 42 Fed. Cl. at 435.

Mr. Coffey estimated \$1,460 in material costs. Mr. Coffey estimate was based upon a review of Kirlin's estimate "using part science and part art." H.Tr., Coffey, 7:79; R4, 11942-43. He only disagreed with Kirlin's material estimate in two major respects. First, using the Means Guide, he determined that the unit prices for the pipe, hangers, and one-quarter bends should be substantially lower than Kirlin's estimate.<sup>496</sup> R4, 11950; H.Tr, Coffey, 7:107-08. Mr. Coffey also determined that the markups for drayage and warranty were not allowable.

For the reasons detailed above, we agree with Mr. Coffey that Kirlin has not shown that the drayage and warranty markups are recoverable. However, inasmuch as Mr. Coffey was unable to recall whether his unit price estimate for the pipe was based upon aluminum rather than the more expensive cast iron pipe installed by Kirlin, H.Tr., Coffey, 7:96, 107-08, we do not credit his material estimate, and find that Kirlin is entitled to recover \$2,280 in material costs.

## 2. Labor Costs

The biggest difference between Kirlin's and Mr. Coffey's estimates was in labor costs, where Kirlin estimate was \$12,464 and Mr. Coffey's \$3,044 or \$2,812.<sup>497</sup> R4, 11942, 11945. Mr. Coffey estimated the labor costs based upon the Means Guide considering the material quantity stated in Kirlin's estimate of only the pipe, as opposed to the methodology of Kirlin's estimate, which was based upon all of the material components implicated by the change, using the MCAA Manual. R4, 11945. Since Mr. Coffey's estimate was apparently predicated upon the installation of much the lighter aluminum pipe as opposed the cast iron pipe actually installed, and did not consider other work covered by the change, such as the core drilling, we do not credit his labor cost estimate. H.Tr., Coffey, 7:96, 101-02, 107-08. Conversely, Mr. Hahr credibly explained the basis for Kirlin's labor cost estimate. H.Tr., Hahr, 7:43, 46.

Moreover, while Kirlin's estimate was based upon as estimated 59-percent straight time and 41-percent overtime, Mr. Coffey's estimate did not account for overtime. However, this work was done in June 2001, when the project had been constructively accelerated by AOC and Kirlin's employees were regularly working overtime. *Id.* at 7:48. Mr. Hahr verified the accuracy of the straight time/overtime ratio used in Kirlin's estimate. *Id.* at 7:68. Under the circumstances, we find that Kirlin is entitled to recover overtime at the ratio claimed.

However, some aspects of Kirlin's labor cost estimates are unsupported or overstated. First, for the reasons discussed above, Kirlin's labor cost estimates apparently overstate its craftsman costs by 10 percent because they fail to account for the lesser wage rates of apprentices. Thus, of

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<sup>496</sup> Kirlin estimate for the pipe was \$6.44 per linear foot and Mr. Coffey's was \$1.41, Kirlin's estimate was \$16.13 per hanger and Mr. Coffey's was \$9.50, and Kirlin's estimate was \$10.49 per one-quarter bend and Mr. Coffey's \$9.50. R4, 11950. Mr. Coffey did not take issue with the material quantities reflected in Kirlin's estimate.

<sup>497</sup> It is not clear from the record which of these figures represented Mr. Coffey's labor cost estimate. R4, 11942, 11945.

Kirlin's claimed \$10,369 in craftsman labor costs, R4, 11945, we find Kirlin is entitled to recover \$9,332 for these claimed costs.<sup>498</sup>

Second, for the reasons discussed above, we find that Kirlin is only entitled to recover the costs of its unproductive foreman based upon an estimated 10 percent of the total 202 craftsman labor hours (20 hours) rather than at 15-percent rate on which its change claim here is based (30 hours). *Id.* Thus, Kirlin is entitled to recover \$1,150 in unproductive foreman labor costs rather than the \$1,750 claimed.<sup>499</sup> *Id.*

Finally, for the reasons detailed above, Kirlin's claimed \$344 in quality control and safety time labor costs are not recoverable. *Id.*

In sum, Kirlin is entitled to recover \$10,482 in labor costs.<sup>500</sup>

### 3. Remainder of Claimed Costs

Mr. Coffey does not take issue with the \$315 in equipment costs, but finds that the \$1,189 in coordination/drafting costs and the \$220 in "other costs" are not allowable. R4, 11942. We agree with Mr. Coffey that the equipment costs are recoverable, and that the "other costs," which represent project manager and foreman costs relating to estimating and managing the change are not recoverable, for the reasons stated above. However, as discussed above, Kirlin has reasonably supported its methodology for determining its coordination/drafting costs for its change claims, and Mr. Coffey has not shown that these costs are not recoverable here. Mr. Coffey states that he believed that these costs were included in the 10-percent overhead allowance because they were for "record drawings." H.Tr., Coffey, 7:105. However, as explained above, these coordination/drafting costs are for installation drawings, which, on this record, Kirlin has shown to be necessary costs of performing the changed work. *See* H.Tr., Hahr, 6:46. We thus find Kirlin is entitled to recover \$1,189 in coordination/drafting costs.

### 4. Conclusion

In sum, Kirlin is entitled to recover \$17,262 calculated as follows:

Material Costs	\$2,280
Labor Costs	\$10,482
Equipment Costs	\$315
Coordination/Drafting Costs	\$1,189

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<sup>498</sup> \$10,369 - \$1,037 (10% of \$10,369) = \$9,332

<sup>499</sup> \$575 (12 x \$47.94 (straight time)) + \$575 (8 x \$71.91(overtime)) = \$1,150.

<sup>500</sup> \$9,332 + \$1,150 = \$10,482.

<b>Subtotal</b>	<b>\$14,266</b>
Overhead (10%)	\$1,427
Profit (10%)	\$1,569
<b>Total</b>	<b>\$17,262</b>

**L. South Addition Ceiling Heights---Mechanical, Electrical, & Plumbing (MEP),  
Clark Change Order No. 810377**

Kirlin claims \$17,219 for certain costs incurred in fitting its pipe into the space above the 8-foot ceiling in the South Addition basement and below a beam above the ceiling. R4, 11659. This claim arose from Clark's unsuccessful attempts to fit all the required MEP utilities into this space, H.Tr., Hahr, 10:190, which led to RFI No. 267a, dated October 26, 1999, which states:

During the drawing coordination efforts of the MEP trade it has become apparent that all of the MEP services cannot be installed without coming below 8'-0" [ceiling] in the basement corridor. Attached is a sketch showing a sample section of the basement corridor at the elevator. As indicated in this sketch, MEP conduit/pipes will be forced to below 8'-0". Contractor recommends that the ceiling height requirement be adjusted to reflect actual conditions.

R4, 11668. The attached sketch showed that some of the installed utilities would fall below the eight foot ceiling. R4, 11669.

In response to this RFI, AOC stated on November 1, 1999:

The layout presented by the attached sketch is significantly different from what was shown on the contract documents. The enclosed marked up sketch shows a suggested modification to the current contractor's layout to meet the intent of the drawings.

R4, 11668. In its markups to Clark's sketch, AOC showed how five of the utilities located in this space, as shown on Clark's sketch, could be moved around to fit within this space. R4, 11669.

On March 1, 2000, Kirlin advised that it considered the AOC response to constitute a change to its contract. R4, 11671. Kirlin's change claim includes costs to anchor the 6-inch low pressure steam line to the block wall on the side of the space instead of anchoring this pipe to the horizontal beam at the top of this space. H.Tr., Hahr, 10:200. Kirlin's claim also includes costs of removing and reinstalling an 8-inch storm drainage pipe within this space. *Id.* at 10:211.

AOC denied this claim because the space problems were assertedly the result of Clark's failure to coordinate its work and its installation of the utilities in this space in a manner inconsistent with the contract drawings. COD, South Addition Ceiling Height MEP.

We find Kirlin's claim to be meritless for a host of reasons. First, AOC's suggestion regarding how the MEP utilities could be located within this space without lowering the 8-foot ceiling cannot reasonably be regarded as a contract change, but on its face was simply intended to assist the contractor in satisfying the contract requirements. In this regard, as discussed above, Clark's contract contained detailed requirements that Clark coordinate its and its subcontractors' work. Specifically, the contract required Clark to "[p]repare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components." R4, K0078. Clark was also obligated to "[c]ontinuously coordinate the work of subcontractors" and to "[h]old a pre-installation meeting at the project site well before installation of each unit of work which requires coordination with other work." R4, K0079, K0084.

Here, the contract drawings showed what and where utilities were to be installed in this space above the 8-foot ceiling and below the beam in the South Addition basement. R4, Drawing M204; H.Tr., Hahr, 10:191-94. The circumstances of the present case are similar to those in *John R. Hundley, Inc.*, where the Veteran's Administration Board of Contract Appeals stated:

Often, as here, separate contract drawings show plumbing lines, HVAC ducts, electrical lines, and other services, in plan view in the ceiling space. The designer represent that it will all fit, but does not detail exactly how everything is going to relate to each other. That task is left up to the prime contractor to work out with its subcontractors, via the "duty to coordinate" clause. This may be accomplished by the prime contractor's creating overlays of the various systems, establishing the relationships between the various trade services, and, as here, creating reflected ceiling drawings which depict the ceiling and the light fixture locations. Normally, any problems of interference arising thereafter between the trades is a matter for resolution between them and prime contractor. Only if it can be shown that an unforeseen, basic design defect is the cause of the problems can responsibility for such difficulties be shifted to the [agency].

*John R. Hundley, Inc., supra*, at 137,029-30.

Here, Clark has not established that it was impossible to fit all of these utilities within this space above the ceiling. In fact, AOC's suggested solution showed how this could be accomplished. R4, 11669. Moreover, as observed by AOC, it appears that the more limited space was caused by Clark's putting more utilities in the space than was contemplated by the contract drawings. See COD, South Addition Ceiling Height MEP. Specifically, electrical conduits, which Drawing M204 showed were to be installed above the beam, were instead installed in this confined space. R4, Drawing M204, detail L-13; Resp. PFF, part 3, tab VI, at 2. In addition, Drawing M204 did not show that the 8-inch storm drainage pipe, which Kirlin had to reinstall, was to be installed in this space. R4, Drawing M204; Resp. PFF, part 3, tab VI, at 2. Since the record evidences that Clark created the problem, AOC is not be liable for helping Clark resolve it.

Moreover, each of the two elements of Kirlin's claim is otherwise meritless. With regard to Kirlin's claim for anchoring the low pressure steam pipe to the block wall, rather than at the horizontal beam as shown on Drawing M204, the Clark sketch submitted with the RFI showed this pipe was to be located next to the block wall rather than at the horizontal beam, so it can hardly be argued that AOC's response to the RFI, which indicated that this pipe should be moved 8 inches, still next to the block wall, was the cause of Kirlin locating this pipe at a location other than at the horizontal beam. R4, 11669.

Also, as observed by AOC in its closing argument on this change claim at the hearing, Kirlin's claim is only for anchoring the pipe to the block wall and contains no credit for anchoring the pipe to the beam. H.Tr., Hahr, 10:239-40. We note that when this discrepancy was brought to Mr. Hahr's attention on cross-examination, he stated that the anchor material and labor cost was a "net add." *Id.* at 10:222-23. We do not credit Mr. Hahr's testimony in this respect, given that the claim documentation contains no suggestion that this was a net figure and given Mr. Hahr's inability to articulate the costs of anchoring the pipe to the beam. *Id.* at 10:223.

With regard to the removal and reinstallation of the 8-inch storm drainage pipe, Kirlin indicated that it had been installed earlier than the rest of the utilities in this space to get water out of the building, *id.* at 10:232, and that to reinstall this pipe it had to be snaked around the other utilities to fit into the space. H.Tr., Taylor, 10:234. However, we note that this pipe is not shown on Drawing M204 as being located in this space. It also was not shown as being in this space on the Clark sketch accompanying the RFI. R4, 11669. Thus, here too, Kirlin has not explained how AOC's response to the RFI (which response did not mention this pipe as AOC was apparently unaware of its existence in the space) was the proximate cause for this pipe's removal and relocation, or why any solution to fitting the utilities in this space would not have required the removal and reinstallation of this pipe that Clark had chosen to locate there.

For the foregoing reasons, we find that Kirlin is not entitled to recover any damages for this change claim.

#### **M. AHU No. 14 Changes, Clark Change Order No. 810383**

Kirlin claims \$30,372 for modifications to AHU No. 14. R4, 11772. The AHUs were provided by Trane. H.Tr., Hahr, 10:250. On July 2, 1999, AOC issued Change Order No. 30 requiring the supply and return ductwork and the casing for the reheat coil to be constructed of stainless steel instead of galvanized sheet metal. *Id.* at 10:245, 250; R4, 11746. On December 16, after some discussion, AOC decided that all of AHU No. 14, including the "suction side[,] would require stainless steel lining and fasteners." R4, 11789; H.Tr., Hahr, 10:252. Kirlin caused the required modifications on AHU No. 14 to be made by Trane and United Sheet Metal. H.Tr., Hahr, 10:263.

Based on an estimate prepared by Mr. Coffey, AOC determined that the reasonable value of this change was \$5,782 (including \$5,256 for Kirlin) and credited Clark's contract by that amount. Resp. Exh. 13; App. Exh. 46; H.Tr., 11:122. Mr. Coffey's estimate did not account for any of the Trane costs. H.Tr., Coffey, 10:285-86.

At the outset of the portion of the hearing relating to this change, Kirlin noticed that it had double counted certain costs invoiced by Trane, the supplier of AHU No. 14, and that \$2,071 should be subtracted from these costs. H.Tr., Hahr, 10:258-61. Accounting for this mistake, Kirlin's remaining claim for this change contained the following elements:

Trane Invoiced Costs	\$14,459
Markups for Warranty (2%)	\$289
Labor Costs	\$184
Other Costs	\$229
United Sheet Metal Subcontract Costs	\$7,827
<b>Subtotal</b>	<b>\$22,988</b>
Overhead (10%)	\$2,299
Profit (10%)	\$2,529
<b>Total</b>	<b>\$27,816</b>

R4, 11739, 11740; H.Tr., Hahr, 10:260-61.

We first find that Kirlin should recover the \$14,459 in invoiced Trane costs. While AOC complains that a paid invoice must be presented as evidence in order for Kirlin to recover these costs, we credit the evidence presented in support of this claim, including Mr. Hahr's testimony that this amount was paid to Trane. H.Tr., Hahr, 10:271-72. However, for the reasons discussed above, Kirlin's claimed warranty markups and "other costs" (project manager time in estimating and managing the changed work) are not recoverable. In addition, while Mr. Coffey's estimate does not take exception to Kirlin's claimed labor costs for this change, H.Tr., Coffey, 10:286; Resp. Exh. 13; we only allow, for the reasons stated above, \$168 of the \$184 claimed to account for the apparent overstatement in Kirlin's craftsman labor rates.<sup>501</sup>

As noted, United Sheet Metal claimed \$7,827 for this change, which was an estimate of its costs supported by a net summary showing the estimated net total costs for the stainless steel ductwork instead of the galvanized ductwork, and the estimates for material and labor costs for each item of stainless steel and galvanized steel implicated by the change. R4, 11750, 11799-802. No representative of United Sheet Metal explained how this estimate was prepared and Mr. Hahr, who was experienced in reviewing sheet metal estimates, only testified that this was a fair and reasonable price for this work. H.Tr., Hahr, 10:262-63. As discussed above, this is insufficient to allow a change claim based on estimated costs. *See Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321.

Mr. Coffey estimated \$4,735 for the United Sheet Metal costs using the Means Guide. Resp. Exh. 13; H.Tr., Coffey, 10:281-82. In contrast to Kirlin, Mr. Coffey generally, but credibly, described how he prepared his estimate. H.Tr., Coffey, 10:281-82. 289-291, 295. In the absence of better evidence, we credit Mr. Coffey's estimate and find that United Sheet Metal is entitled to recover \$4,735 for this element of the change.

<sup>501</sup> \$184 - \$18 (10% of \$184) = \$168.

In sum, we find that Kirlin is entitled to recover \$18,172 for this change calculated as follows:

Trane Costs	\$14,459
Kirlin Labor Costs	\$168
United Sheet Metal Costs	\$4,735
<b>Subtotal</b>	<b>\$19,362</b>
Overhead (10%)	\$1,936
Profit (10%)	\$2,130
<b>Total</b>	<b>\$23,428</b>
Amount Previously Paid	<\$5,256>
<b>Total Recoverable</b>	<b>\$18,172</b>

**N. Addition of Pool Water Level Controls, Clark Change Order No. 810094**

Kirlin claims \$14,839 in costs for Change Order No. 50, which added automatic level controllers and fill lines for the Garden Court and Palm House pools to be installed in accordance with sketches RD-PO4, RD-PO5 and RD-PO6. R4, 4248, COF 4748-4751. Kirlin's claim was broken down as follows:

Material Costs	\$1,806
Labor Costs	\$4,971
Coordination/Drafting Costs	\$3,809
Equipment Costs	\$58
Excavation Costs	\$971
Other Costs	\$483
<b>Subtotal</b>	<b>\$12,098</b>
Overhead (10%)	\$1,210
Profit (10%)	\$1,331
<b>Total</b>	<b>\$14,639</b>

R4, 4249. Based on an estimate prepared by Mr. Murphy of DMJM, AOC determined that the value of the change was \$2,790 (\$2,536 for Kirlin), and issued a contract amendment crediting Clark's contract in this amount. R4, 4181, COF 4746. The dispute here only concerns quantum.

**1. Material Costs**

Here too, Kirlin prepared its material cost estimate for this change based on a takeoff of the drawings to determine what materials will be used in the change and the Harris National Mechanical Estimator to determine the unit prices of the material. Kirlin's material estimate for this change listed 14 different types of material with estimated quantities and unit prices. App. Exh. 31.

Mr. Murphy's estimate only listed 6 different types of material for this change. R4, COF 4746. One reason that his estimate did not list some of the materials listed in Kirlin's estimate was that

Mr. Murphy's estimate was based upon the Means Guide, which, as discussed above, included some materials as part of the pipe estimate. H.Tr., Murphy, 6:143-44.

In view of the differences in quantities between Kirlin's and Mr. Murphy's material and labor cost estimates, Mr. Hahr performed his own takeoff analysis of the drawings just before the hearing, which, he testified, verified the accuracy of Kirlin's material estimate. H.Tr., Hahr, 6:107-19. At the hearing, Mr. Murphy defended his estimate and pointed out what he believed were the flaws in the assumptions upon which Kirlin based its estimate. H.Tr., Murphy, 6:134-44. Both Mr. Hahr and Mr. Murphy were considered by the Board to be experts in piping and piping pricing, and both explained the bases for their estimates by reference to the drawings for the change. H.Tr., 6:131; Hahr, 6:101-02, 108-09, 111-14, 209-12; Murphy, 6:133-38; R4, COF 4749-51. However, neither expert testified that his analysis was based upon an analysis of what was actually installed.

The major differences in estimated quantity in the two estimates were in the three-quarters-inch pipe, where Kirlin estimated 100 feet as opposed to Mr. Murphy's 70 feet, and in the 90-degree elbows, where Kirlin estimated 20 elbows and Mr. Murphy estimated 12 elbows. App. Exh. 31; R4, COF 4746. In addition, while the hangers and riser clamps were not specifically mentioned in Mr. Murphy's estimate, their cost was considered as part of his pipe estimate using the Means Guide methodology, with the assumption of a hanger and a riser clamp for every 10 feet of pipe (that is 7 hangers and 7 riser clamps), whereas Kirlin's material estimate reflected 27 hangers and 27 riser clamps. H.Tr., Murphy, 6:138, 143-44, 153; R4, 4264.

Mr. Hahr testified that his pipe and elbow estimates considered the fact that the material was being installed in a very narrow cement trench with a variety of pipe and electrical conduit, and Kirlin had "to find a routing through the utilities where you can, find a side of the wall that you core drill, exit and still be able to maintain cover to get out to the port." H.Tr., Hahr, 6:112-13, 209-11. In this regard, he noted that the drawings for the change were diagrammatic sketches, which left to the contractor's discretion how to fit the pipe into the trench. *Id.* at 6:209. He also explained that, in view of this congestion, Kirlin's estimates for hangers and riser clamps were not overstated because the pipe needs to be supported an average of every six feet (as required by a specification requirement he did not identify) and each time it changes direction, and "when it exits the wall." *Id.* at 6:110-111, 117, 212.

Acknowledging Mr. Hahr's testimony with regard to the congestion in the trench, Mr. Murphy used the change drawings to illustrate how he calculated pipe and elbow estimates based upon the "design intent" of the drawings, which, as he described the changes reflected on each drawing, contemplated that there would much less pipe actually in the trench than as described by Mr. Hahr. H.Tr., Murphy, 6:133-37, 142, 153-54; R4, COF 4749-51. Mr. Murphy also explained that, for this same reason, Kirlin overestimated the number of hangers and riser clamps because while pipe in the trench needed to be supported, much of the pipe installed there "should be supported by the backfill material or grading material." H.Tr., Murphy, 6:139, 153-54.

Based on our review of the record and given that neither expert based his testimony on how the pipe was actually installed under this change, we find both experts' explanations and material estimates to be equally credible for the pipe, elbows, hangers, and riser clamps, and again

employ a jury verdict method to determine these material quantities. That is, we find reasonable material estimates for this change to be 85 feet of pipe (the midpoint between 100 and 70 feet), 16 elbows (the midpoint between 20 and 12 elbows), 17 hangers (the midpoint between 27 and 7 hangers), and 17 riser clamps (the midpoint between 27 and 7 riser clamps).<sup>502</sup> Mr. Hahr credibly explained the need and the basis for the estimate for the other material items in Kirlin's estimate (reducing tees, die unions, male adapters, ball valves, joints, water level controls, eye ball fittings, link seal pipe and core drilling), and this testimony was not rebutted by Mr. Murphy or AOC.<sup>503</sup> H.Tr., Hahr, 6:114-19.

Since Mr. Murphy's estimate does not include all the material needed for this change, we find it appropriate to use the material unit prices identified in Kirlin's estimate to determine the reasonable cost estimate for the allowable material. R4, 4250, 4264. However, for the reasons detailed above, Kirlin is not entitled to recover its \$168 in markups on the material for drayage and warranty. Based on the foregoing, we find that Kirlin is entitled to \$1,482 in material costs.<sup>504</sup>

## 2. Labor Costs

Kirlin claims \$4,971 in labor costs for this change based on 119 labor hours. R4, 4253. The claim is based upon a takeoff analysis of the change drawings and the MCAA Manual, at least with regard to the first group of material items implicated by the change, a methodology that we have found to be a reasonable basis to estimate change costs. R4, 4264. As noted by Mr. Murphy, there is no evidence as to how the labor was calculated for the second group of material items and we therefore disallow the 35.4 craftsman hours and associated labor costs related to this second group of material items. H.Tr., Murphy, 6:141; *see* R4, 4250.

With regard to the first group, the claimed 64.87 craftsman hours are affected by our resolution of the material quantity dispute above, given Kirlin's reliance on the MCAA Manual to estimate its change costs. R4, 4264. Thus, here too we use a jury verdict method to determine the reasonable labor hours for this change, by first multiplying the revised quantities determined above for the pipe, hangers, elbows, and riser clamps by the labor units determined under the MCAA Manual, and then adding the resulting craftsman hours calculated for each material item

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<sup>502</sup> In its claim, Kirlin did not employ a 5-percent waste factor in calculating the material costs for its pipe, although it applied this factor in calculating the labor costs. R4, 4264; H.Tr., Hahr, 6:109.

<sup>503</sup> We note that the material and labor cost estimate was based upon two groups of material, but the backup for only one of the groups is in the record. R4, 4250, 4264. The second group of material, for which no backup was provided, includes water level controls, eye ball fittings, link seal pipe and core drilling. Mr. Hahr explained the basis for pricing the material for both groups, and AOC did not specifically take issue with his explanation and recognized that the items of material in both groups were used for this change. H.Tr., Hahr, 6:111-19; *see* R4, COF 4746; App. Exh. 31.

<sup>504</sup> (85 feet of pipe x \$1.53 unit price = \$130.05) + (17 hangers x \$10.14 = \$172.38) + (16 elbows x \$.62 = \$9.92) + (reducing tee, \$15.72) + (die union, \$15.84) + (male adapter, \$5.88) + ball valve, \$29.40) + (17 riser clamps x \$2.94 = \$49.98) + (joints, \$9.06) = \$438.23, *see* R4, 4264, + \$1,044, *see* R4, 4250 = \$1,482 (rounded).

to determine the total craftsman hours for the change. We calculate that 48 craftsman hours is a reasonable estimate for this change.<sup>505</sup>

Kirlin's claim is based upon a craftsman labor rate of \$40.99 per hour.<sup>506</sup> R4, 4253. However, for the reasons discussed above, this figure apparently does not account for Kirlin's use of apprentices and we discount this figure by 10 percent to \$36.89 per hour.<sup>507</sup> Applying this figure to the 48 labor hours determined above, we find that the reasonable cost for Kirlin's craftsman is \$1,771.<sup>508</sup> Also, for the reasons discussed above, we allow \$232 for 10 percent or 5 unproductive foreman hours at \$46.34 per hour, rather than the 15-percent unproductive foreman hours included in the change claim.<sup>509</sup> *Id.* Finally, for the reasons stated above, we do not allow the claimed quality control and safety time hours. In sum, we find Kirlin is entitled to recover \$2,003 in labor costs.<sup>510</sup>

### 3. Coordination/Drafting Costs

Kirlin claims \$3,809 in coordination/drafting costs. R4, 4254. This element of Kirlin's change claim includes 56 senior coordinator labor hours at \$49.43 per hour for a total \$2,768. *Id.* In this regard, Mr. Hahr testified that because of the congestion in the trenches, more coordination would be required to efficiently install the pipe than for other changes and in fact in this case a senior coordinator (rather than a coordinator) was needed. H.Tr., Hahr, 6:113-14, 122-23. Consistent with Kirlin's methodology, most of the other coordination/drafting labor and equipment costs, totaling \$649, are a percentage of the senior coordinator's costs. R4, 4254. The claim also includes \$45 in materials and a 10-percent markup (\$346) on the total coordination/drafting costs to provide as-built drawings. *Id.*

Mr. Murphy specifically took issue with Mr. Hahr's explanation of the reasons why greater coordination was required for this change because in his view Mr. Hahr exaggerated the amount of pipe that was installed in the trench and the amount of coordination that would be necessary. H.Tr., Murphy, 6:141-42.

As indicated above, under its change claim methodology, Kirlin's coordination/drafting costs are based upon its estimated labor hours (except drafting materials), which in turn are based upon the estimated material takeoff. As discussed above, we find Mr. Hahr's and Mr. Murphy's

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<sup>505</sup> ((85 feet of pipe + 4.25 for the five-percent waste factor (H.Tr., Hahr, 6:106) = 89.25 feet) x .06 (labor unit) = 5.355 hours) + (17 hangers x 1.11 = 18.87 hours) + (16 elbows x .57 = 9.12 hours) + (reducing tee, 3.05 hours) + (die union, 2.48 hours) + (male adapter, 1.72 hours) + (ball valve, 2.04 hours) + (17 riser clamps x .29 = 4.93) + (joints, 0) = 47.565 hours (rounded to 48 hours).

<sup>506</sup> There is no support for the \$31 labor rate used in Mr. Murphy's estimate. R4, COF 4746.

<sup>507</sup> \$40.99 - \$4.10 (10% of \$40.99) = \$36.89.

<sup>508</sup> \$36.89 x 48 = \$1,771.

<sup>509</sup> \$46.34 x 5 = \$232.

<sup>510</sup> \$1,771 + \$232 = \$2,003.

testimony equally credible with respect to how this change was to be executed with regard to the claimed material and labor costs, and used a jury verdict method to determine the amount of those claimed costs that should be recovered.

Here too, we will use a jury verdict method to determine the recoverable coordination/drafting costs. Since we found only 53/119 of the claimed labor hours were reasonable for this change,<sup>511</sup> we think the same ratio should be used to determine the recoverable coordination/drafting costs that are based on a percentage of the total labor hours. Thus, we find Kirlin is entitled recover \$1,522 for the senior coordinator and the other coordination labor and equipment costs that were based upon the senior coordinator's hours, plus the \$45 in material costs, for a total \$1,567.<sup>512</sup> The claimed markup for as-built drawings is not allowed because as-built drawings are included within the 10-percent overhead allowance. R4, K0189.

#### 4. Other Claimed Costs

We find Kirlin is entitled to recover its claimed \$971 in excavation costs and \$58 in equipment costs that were not included in Mr. Murphy's estimate as these figures are reasonably supported, R4, 4251, 4252, but, for the reasons stated, Kirlin's may not recover its "other costs" representing the labor hours of the project manager and foreman in estimating and managing the change. R4, 4255.

#### 5. Conclusion

In sum, Kirlin is entitled to recover \$4,822 for this change calculated as follows:

Material Costs	\$1,482
Labor Costs	\$2,003
Coordination/Drafting Costs	\$1,567
Excavation Costs	\$971
Equipment Costs	\$58
<b>Subtotal</b>	<b>\$6,081</b>
Overhead (10%)	\$608
Profit (10%)	\$669
<b>Total</b>	<b>\$7,358</b>
Amount Previously Paid	<\$2,536>
<b>Total Recoverable</b>	<b>\$4,822</b>

<sup>511</sup> While Kirlin estimated 119 labor hours for this change, R4, 4253, we only allowed 53 labor hours (48 craftsman hours + 5 foreman hours = 53 labor hours) for this change.

<sup>512</sup>  $2,768 + \$649 = \$3,417 \times 53/119 = \$1,522 + \$45 = \$1,567$ .

### O. Revise Mezzanine Mechanical Room, Clark Change Order No. 810083

Kirlin claims \$3,934 for the preparation of revisions to the coordination drawings for the mezzanine mechanical room. R4, COF 5165; H.Tr., Hahr, 7:140. This claim was the result of AOC Change Order No. 45 issued on September 29, 1999, which changed the mezzanine mechanical room because Judd had indicated on August 25, 1999 that the electrical equipment would not fit into the room as specified and comply with the National Electrical Code.<sup>513</sup> R4, COF 5144, 5203-05. Change Order No. 45 was amended on October 21 with a revised sketch. R4, COF 5148. On October 22, United Sheet Metal, Kirlin's subcontractor, advised that this change affected its ductwork installation in the mezzanine mechanical room and that it needed a new ductwork design to price this change. R4, COF 5129. This request was forwarded to AOC, which responded on November 19 as follows:

At this time, any potential revisions that could be prepared by our consultants would be a "best guess" due to the fact that your electrical subcontractor will need to lay out its equipment in the area first and then depending on final layout, the ductwork layout will have to be revised to accommodate the electrical equipment. Since your subcontractors have been working on their coordinated drawings for the mezzanine, a more efficient way to resolve this issue would be to have Judd complete their proposed layout and then meet to review the impact of the electrical equipment on the ductwork layout. This way a revised ductwork layout can be determined that is coordinated with the electrical equipment. Please advise when this meeting can be held.

R4, COF 5126.

Pursuant to this response, Kirlin assumed responsibility for coordination between the electrical equipment and the ductwork and the other utilities in the mezzanine mechanical room. H.Tr., Hahr, 7:139. According to Kirlin, this coordination work took place between January 5 and February 2, 2000. R4, COF 5175-99. The revision to Kirlin's coordination drawings implementing this change was dated January 24, 2000. R4, Coordination Drawing MP 2-5.

Unlike other Kirlin change claims, the costs claimed here are only for coordination/drafting costs, and are not merely an estimate of the change, but are supported by time tickets for the actual time spent by the individuals (primarily a senior coordinator) who performed the work on this change on January 5, 18, 19, 20, 21, 24, and 26, and February 2. R4, COF 5175-99. Mr. Hahr explained that, unlike other Kirlin changed work, Kirlin had already completed the work implicated by the change, that is, its coordination drawings, but because of the change, Kirlin had to "go back to ground zero to come up with a new coordination drawing," so it assigned one coordinator/draftsman and tracked his readily segregable hours working on this change. H.Tr., Hahr, 7:142-44. The documentation reasonably supports the incurrence of these claimed costs.

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<sup>513</sup> Change Order No. 45 implemented the proposed September 13 DMJM fix of this problem. R4, COF 5203.

As a result of Change Order No. 45, Clark and four of its subcontractors, including Kirlin, submitted claims totaling \$17,531. R4, COF 5133. On November 13, 2000, AOC determined that the reasonable value of this change was \$11,488 and adjusted Clark's contract by that amount. R4, COF 5117. Included in this amount was \$660 for Kirlin's portion of the claim. R4, COF 5114.

AOC's essential position on this claim is that Kirlin has not shown that this work was the result of the change, but only satisfied Clark's contract requirement that coordination drawings be prepared. Resp. PFF, part 3, tab VII, at 4. In this regard, the contract requires:

Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and material fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

R4, K0078.

However, in this case, AOC essentially ordered more than that Clark satisfy its contractually required coordination requirements, but required that it resolve how to fit all the utilities into the compressed mezzanine mechanical room as changed by Change Order No. 45. *See* R4, COF 5126. However, as is also contended by AOC, we find that Kirlin has not shown that all of the claimed costs here were the result of Change Order No. 45 and determining and documenting how to fit the utilities into the mezzanine mechanical room, but some costs seem to relate to Clark's satisfying its contractually-required coordination requirements.<sup>514</sup>

Based on our review, we first note that Kirlin's affected coordination drawings were modified on January 5 for a reason unrelated to this change, as evidenced by the fact that this revision to the coordination drawings referenced Clark Change Number No. 810039 (deletion of the reverse osmosis waste system to the National Garden, *see* R4, 4755) rather than Clark Change Order No. 810083 (the Change Order No. 45 work).<sup>515</sup> R4, Coordination Drawing MP 2-5. Kirlin's senior coordinator performed 4 hours of work that he charged to Clark Change Order No. 810083 on January 5, whereas he did not perform any more work on revising the coordination drawings that he charged to Change Order No. 810083 until January 18. R4, COF 5176-78. Notwithstanding the January 5 timesheet's reference to Clark Change Order No. 810083, we think this coincidence leads to the reasonable inference that his work may have involved the January 5 revision and we thus disallow the \$272 in coordination/drafting costs incurred on that date.

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<sup>514</sup> Clark did not respond to these latter AOC contentions in its reply brief.

<sup>515</sup> Kirlin's coordination drawings were initially prepared on September 7, 1999 and first revised on October 8, 1999 (apparently for reasons unrelated to Change Order No. 45). R4, Coordination Drawing MP 2-5.

The senior coordinator also charged 10 hours and the coordination manager 1 hour and related coordination/drafting costs totaling \$710 for January 26 and February 2. R4, COF 5194-99. As noted by AOC, these costs were incurred after the January 24 revision date indicated on the coordination drawing for the changes related to Change Order No. 810083, as marked on the coordination drawing. R4, Coordination Drawing MP 2-5. Kirlin has not explained why time was being charged after the revised coordination drawings were issued. On the other hand, the "final signoff" of these coordination drawings by Clark and the affected subcontractors first occurred on February 2. R4, Coordination Drawing MP 2-5; H.Tr., Hahr, 7:164-67. This final signoff had to be done on any coordination drawings and was not simply the result of Change Order No. 45. See H.Tr., Hahr, 7:167. Thus, given that the coordination drawings had not previously had a final sign off by the affected trades, it appears that these costs were incurred to satisfy Clark's coordination obligation under the contract, rather than to determine how all the utilities would fit into the mezzanine mechanical room and to prepare coordination drawings showing how this could be done, which work was apparently accomplished by January 24 as indicated on the coordination drawing. R4, Coordination Drawing MP 2-5. We thus disallow these \$710 in claimed costs.

We also note that Kirlin has applied a 10-percent markup for "as-built" drawings to each day's coordination/drafting costs. See, e.g., R4, COF 5183. Such a cost is included in the 10-percent markup allowed for overhead and is not here recoverable. R4, K 0189.

We find that Kirlin is entitled to recover \$2,219, which we calculate as follows:

Coordination/Drafting Costs	\$2,379 <sup>516</sup>
Overhead (10%)	\$238
Profit (10%)	\$262
<b>Subtotal</b>	<b>\$2879</b>
Previously Allowed Amount	<\$660>
<b>Total</b>	<b>\$2,219</b>

#### **P. Relocate Fire and Water Service, Clark Change Order No. 810346**

On October 18, 1999, AOC issued Change Order No. 51 requiring the relocation of the entry of the fire and water service tie-ins along the east wall of the South Addition basement due to the presence of an underground PEPCO electrical ductbank. R4, COF 5704. At the time the interfering PEPCO electrical ductbank was discovered, Kirlin had already cored holes in the South Addition wall and installed pipe for the fire and water services. H.Tr., Hahr, 6:260. As a result of the change, in October 1999, Kirlin had to core drill two new holes in the wall north of the two previously cored holes, remove the previously installed pipe from these holes, and install this pipe in the two newly cored holes. *Id.* at 6:257, 259-61.

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<sup>516</sup> \$99 (January 18) + \$490 (January 19) + \$650 (January 20) + \$650 (January 21) + \$490 (January 24) = \$2,379. R4, COF 5180, 5183, 5186, 5189, 5192.

Kirlin did not submit a claim for this change until March 23, 2001.<sup>517</sup> Its claim was for \$4,064, but Clark adjusted Kirlin's claim to \$3,746 before submitting it to AOC.<sup>518</sup> R4, COF 5702-03, 5705. AOC's contracting officer decision denied Kirlin's claim because AOC believed that this claim was based on Clark's failure to coordinate the work between Livingston and Kirlin, given that Livingston had installed pipe in one of the two holes initially drilled by Kirlin. COD, Relocate Fire and Water Service.

However, as explained by Mr. Hahr at the hearing, Livingston utilized one of the holes initially drilled by Kirlin for a run of pipe for a yard hydrant. H.Tr., Hahr, 6:264-65, 275. This use did not change the fact that Kirlin needed to drill two new holes north of the previously drilled holes in order to comply with Change Order No. 51. *Id.* at 6:278. Thus, Kirlin is entitled to recover its reasonable and allowable costs caused by this change.

Kirlin's \$3,746 claim as modified by Clark breaks down as follows:

Material Costs	\$1,305
Labor Costs	\$1,613
Coordination/Drafting Costs	\$178
<b>Subtotal</b>	<b>\$3096</b>
Overhead (10%)	\$310
Profit (10%)	\$340
<b>Total</b>	<b>\$3,746</b>

R4, COF 5706.

Although AOC does not argue that any of these costs were not incurred, we find that Kirlin may not recover the \$121 in material markups for drayage and warranty and thus may only recover \$1,184 in material costs.<sup>519</sup> R4, COF 5707.

In addition, there are a number of issues regarding Kirlin's labor costs. First, we note that although this work was done in 1999, Kirlin's claim is erroneously based on its 2001 labor rates. Kirlin's hourly rates for 1999 work are \$39.50 for craftsman and \$42.82 for foreman, whereas the rates claimed here and for 2001 work are \$42.60 for craftsman and \$47.94 for foreman. R4, 11945, COF 5708. Also, for the reasons stated above, Kirlin's craftsman labor rate (for all years) was apparently overstated by 10 percent, as it apparently did not account for the apprentices used

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<sup>517</sup> AOC complains of Kirlin's late notification of this claim. H.Tr., 6:284. Mr. Hahr testified that this late notification occurred because of the numbers of changes issued under this contract, and that this one "fell by the wayside," given its small value and Kirlin's focus on getting the bigger claims priced. H.Tr., Hahr, 6:258. We find Kirlin's late claim for damages caused by AOC's change order provides no basis to deny Kirlin's claim. AOC does not allege, and the record does not otherwise suggest, that AOC was prejudiced by this late submitted claim.

<sup>518</sup> Kirlin states that it would be satisfied with the amount claimed by Clark. H.Tr., 6:282.

<sup>519</sup> \$1,305 - \$121 = \$1,184.

on this project. We will thus use an hourly rate of \$35.55 here to determine the craftsman labor costs for this change.<sup>520</sup> This results in a total \$1,102 recoverable for the 31 craftsman hours claimed.<sup>521</sup> See R4, COF 5708. Also, for the reasons stated above, we will only allow recovery of unproductive foreman labor hours at a 10-percent rate, that is, 3 hours rather than the 5 hours claimed. *Id.* Thus, the amount of recoverable unproductive foreman labor costs is \$128.<sup>522</sup> Finally, for the reasons stated above, we do not allow recovery of the claimed labor costs for quality control and safety time. Thus, we allow \$1,230 in labor costs for this change.<sup>523</sup> We also find that Kirlin is entitled to recover its claimed \$178 in coordination/drafting costs. R4, COF 5709.

In sum, Kirlin is entitled to recover \$3,136 for this change calculated as follows:

Material Costs	\$1,184
Labor Costs	\$1,230
Coordination/Drafting Costs	\$178
<b>Subtotal</b>	<b>\$2,592</b>
Overhead (10%)	\$259
Profit (10%)	\$285
<b>Total</b>	<b>\$3,136</b>

#### **Q. Water Meter Vault Relocation, Clark Change Order No. 810376**

Kirlin claims \$2,191 for costs associated with AOC's response to RFI No. 284. R4, 11624. This claim for work performed in late 1999 was only submitted to AOC on June 1, 2001.<sup>524</sup> R4, 11622; H.Tr., Hahr, 6:295. In RFI No. 284, dated October 26, 1999, Clark requested the following:

The location of the water vault as shown on the civil drawings will not work. The distance between the 69 kV electric line and the storm drain is only 6'. The vault needs a minimum of 7' to fit. We propose that the vault be moved approximately 10' to 15' west to avoid this conflict. Also P104 and P100 show different locations for the east wall penetrations for the water, fire, storm, and stand lines. Due to the conflicts in this area, we propose to install the lines as follows. From North to South: 6" Fire, 6" Storm, 4" water, and 6" stand Pipe. The first two sleeves will have to be re[-]cored 6" higher to avoid the 36" PVC air duct. We

<sup>520</sup>  $\$39.50 - \$3.95$  (10% of \$39.50) = \$35.55.

<sup>521</sup> 31 hours x \$35.55 = \$1,102.

<sup>522</sup> 3 hours x \$42.82 = \$128.

<sup>523</sup> \$1,102 + \$128 = \$1,230.

<sup>524</sup> Mr. Hahr identified the same reasons for the delay in submitting this claim as he did for Clark Change Order No. 810346.

have assigned our CO# 810098 to track all costs and time associated with this issue.

R4, 11631. In response, on November 29, 1999, AOC stated:

Move the water meter vault directly west approximately 20' from planned location, elevation/orientation to remain the same. Provide the exact location both horizontal and vertical on the required as-built drawings.

*Id.*

The water meter vault is located outside the building itself. In response to the RFI, Kirlin located the water meter vault 20 feet west of the planned location (nearer the building). The water pipe going to the water vault is the same pipe that exits the east wall of the South Addition (which had to be relocated to the north because of the conflict with the PEPCO ductbank as discussed above). According to the contract drawings, the water pipe was to exit the building and go straight through the water meter vault to the tie-in point. R4, Drawing C204.

Kirlin claims that this RFI caused two compensable changes. First, Kirlin states that it had to core drill the north side of the factory-made water meter vault (which had entries for the water pipe on the east and west sides) to allow the water pipe to turn north in the vault to tie into the public water tap located north and east of the vault. H.Tr., Hahr, 6:293-94, 296; R4, Drawing C204 (as marked by Mr. Hahr). Second, Kirlin states that it had to offset a 6-inch storm line that exited the South Addition away from the water line to tie into a 10-inch storm drain in order to avoid the relocated water meter vault. H.Tr., Hahr, 6:292-93, 297; R4, Drawing C204 (as marked by Mr. Hahr).

On cross-examination, however, Mr. Hahr testified that the need to core drill the north side of the water meter vault was not caused by the movement of the water meter vault, but was caused by AOC's failure to answer the other questions in the RFI concerning Clark's proposal to locate these pipes in a north to south order inconsistent with the order shown on Drawing P104. H.Tr., Hahr, 6:302, 306-07, 313-15. He testified that if the lines exiting the South Addition had been reordered as suggested by Clark in the RFI, this extra work "might" not have been required. *Id.* at 6:302. However, he later admitted on cross-examination that the reason that the water pipe had to exit through the north side of the water meter vault was because the tie-in point for the water line had shifted north from the location on the drawings for reasons he was unable to identify (although he hypothesized that it may have been because of the PEPCO ductbank issue), *id.* at 6:315-16, 318-19; R4, Drawing C204 (as marked by Mr. Hahr), and that the RFI "question" by Clark concerning the north to south order of the pipes was a "poorly asked question." H.Tr., Hahr, 6:315.

We find that Kirlin has not shown that this aspect of its claim is a compensable constructive change. The record does not show that these costs were incurred because of the relocation of the water meter vault, and the RFI did not put AOC on reasonable notice that unless something was done the water pipe would have to exit the water meter vault through the north side in order to reach the public water tap and that AOC would be expected to compensate Kirlin for this.

With regard to the other portion of the claim, the record evidences that Kirlin was required to tie-in the 6-inch storm drain to the 10-inch storm drain at a point north of where it was planned because of the relocation of the water meter vault. R4, Drawing C204 (as marked by Mr. Hahr); H.Tr., Hahr, 6:292-93. However, Kirlin has not explained why the tie-in at the new point would be any more costly than a tie-in at the point where the contract drawings originally specified. See H.Tr., Hahr, 6:302-03. Thus, we also deny this aspect of this claim.

## **XVII. KALOS' CLAIMS**

Kalos' claims \$48,000 in delay damages for its extended on-site performance and \$33,110 in acceleration damages.<sup>525</sup> H.Tr., Branson, 14:115; R4, 5956-57; R4, Supp. 08 0269; see App. PFF ¶¶ 427-28; App. Reply Brief at 43, 88-89. Kalos has also submitted a change claim involving the backfill at the glass house and courtyard. Kalos is a site utility and site paving company that has operated in the Washington, D.C. area since 1984. H.Tr., Branson, 14:85. Clark entered into a subcontract agreement with Kalos to perform various aspects of the Botanic Garden renovation contract, including the excavation, installation, and backfill of interior air duct systems, interior piping, fittings, exterior storm and sewer system, and certain paving and curb work. *Id.* at 14:87; see App. PFF ¶ 424. Thus, Kalos planned to be on the job site for most of the duration of the renovation project. H.Tr., Branson, 14:87.

### **A. Delay Claim**

As indicated, Kalos' claims \$48,000 in delay damages for its extended on-site performance. C4 Supp. 08 0269. Specifically, Kalos argues that due to owner changes, work resequencing changes, and other delays, the renovation project required the company to perform for approximately an additional 12 months. *Id.* Kalos computed its delay claim based upon the percentage of time spent by both its project superintendent and project engineer for the additional performance period. *Id.*; H.Tr., Branson, 14:117-19. In this regard, Kalos determined that the portion of these individuals' salaries allocable to this contract was \$1,000 per week, which it multiplied by 4 weeks and then by 12 months. C4 Supp. 08 0269. At the hearing, Peter Branson, Kalos' president, explained the duties and additional efforts expended by its project superintendent and engineer during the extended performance period. H.Tr., Branson, 14:117-19. Kalos also substantiated the salaries of the two employees upon which its claim here is based. App. Exh. 59; H.Tr., Branson, 14:122-23.

AOC does not dispute the sufficiency of the amount Kalos claims.<sup>526</sup> Instead, Respondent argues that neither Clark nor Kalos has a right to recover because the government was not responsible

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<sup>525</sup> While Clark's revised claim indicates that Kalos seeks a total of \$113,000 in acceleration and \$0 for delay, App. Exh. 139, attachs. 8, 10, the record otherwise shows that Kalos actually claims \$33,110 for acceleration and \$48,000 for delay.

<sup>526</sup> Specifically, Respondent acknowledges that the subcontractor has established: (1) the reasonableness of Kalos' labor charges; (2) that the additional delay costs were, in fact, incurred (not estimated) additional costs which were reasonable in amount and necessary to performance of the contract work; (3) that Kalos reasonably expected that its "interior" work would be completed by September 2000; and

for the delayed project completion. Resp. Brief, part 1, § I.B.3. Respondent argues, "As goes Clark's asserted right to additional time for completion, so goes Kalos' project extension claim. The claim of Kalos for additional cost due to additional time can not rise above any right of Clark to additional time." Resp. Reply Brief, part 5, § VI.C.

We agree with AOC's last point. As discussed above, there were contract delays totaling 360 calendar days incurred by Clark and its subcontractors that were concurrently caused. We apportion responsibility for this delay based upon how much AOC contributed to the delay, and find that Kalos is entitled to recover 120.4/421 of its \$48,000 in delay costs, or \$13,727.

### **B. Acceleration Claim**

Kalos also claimed acceleration damages in the amount of \$33,110. H.Tr., Branson, 14:115; R4, 5956-57. This claim concerns the installation of the primary air duct system in the East and West Low Houses during the Spring of 2000. On February 4, 2000, AOC issued Change Order No. 66--Overtime for Air Duct Installation. R4, 5920. The change order stated, in pertinent part:

In accordance with the requirements of Article 23 of the General Conditions, you are hereby authorized to proceed with overtime work, extended hours during the week and on weekends, for the installation of the primary air duct in the Low Houses. This authorization is for a not-to-exceed amount of \$25,000. When you have expended \$20,000, notify this office so that we can make a determination on whether ordering additional overtime is required.

*Id.*

On February 8, Clark acknowledged receipt of Change Order No. 66, "authorizing us to proceed with \$25,000 for overtime for the air duct installation." R4, 5919. Clark provided AOC with an estimate from Kalos for an accelerated completion of the low house air duct installation in the amount of \$162,786.<sup>527</sup> R4, COF 2805. Clark also recognized that additional AOC authorization (beyond the \$25,000 previously provided) would be required in order to fully implement the Kalos acceleration plan. R4, 5919.

Clark then instructed Kalos to accelerate the installation of the air duct system. According to Mr. Branson, "Clark directed us to accelerate the job, staff it, work overtime, whatever was necessary to meet target dates for the completion of the primary and secondary air duct system." H.Tr., Branson, 14:107. Kalos did in fact accelerate its work here during February and March 2000. *Id.* at 14:107-16.

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(4) that the claimed additional costs were incurred by Kalos between October 2000 and September 2001 and were capable of being computed on a per diem basis. AOC PFF, part 1, § I.B.3, tab 8.

<sup>527</sup> Kalos' cost estimate reflected that while the required number of manhours would remain the same, 25 percent of labor hours would become overtime. R4, COF 2805. Kalos' estimate also stated, "Cost is for labor overtime only. No equipment is added as additional costs." *Id.*

On February 29, Clark informed AOC that it had expended all the funds authorized by AOC to accelerate the underground air duct installation. R4, 5951. Clark also advocated, at a minimum, an additional \$50,000 to continue the acceleration of the underground air duct installation. *Id.* AOC in turn informed Clark that, "we are not authorizing any additional overtime for the installation of underground air duct, at this time."<sup>528</sup> R4, 5952. AOC also stated that once it had received Clark's cost breakdown it would determine whether any additional overtime work associated with the installation of the underground air ducts would be authorized. *Id.*

On March 10, Clark provided AOC with a revised cost breakdown in the total amount of \$71,500 for acceleration of the underground air duct installation for the low houses.<sup>529</sup> R4, 5953; COF 2800-01. Again Clark acknowledged that additional AOC authorization of funds was required to maintain an accelerated effort here. R4, 5953. AOC subsequently requested additional information from Clark regarding its cost proposal. R4, 5954. Clark complied with this request on March 31, stating, "attached for your review and action is additional information with the acceleration of the underground air duct installation at the low houses." R4, 5921. Included with Clark's letter was Kalos' summary of acceleration costs and detailed supporting documentation. R4, 5923-48, 5956-57, 5966-6011. Clark also informed AOC that while Change Order No. 66 had authorized a not-to-exceed amount of \$25,000, Kalos had to date expended in excess of \$33,000 for the aforementioned acceleration. R4, 5921.

At the hearing, Mr. Branson discussed the \$33,110 in expenses that Kalos had incurred to further the acceleration of the air duct installation. Specifically, Kalos utilized a crane to install the large concrete air duct piping and incurred premium time expenses for use of that equipment. H.Tr., Branson, 14:110-11. Kalos also leased equipment (*i.e.*, mini excavator, skidsteer loader) and utilized the services of a concrete core drilling company to further its acceleration. *Id.* at 14:111-13. Lastly, Kalos' employees worked overtime on the installation of the air duct system.<sup>530</sup> *Id.* at 14:113.

On October 24, AOC issued its unilateral determination regarding Change Order No. 66, finding that Kalos had demonstrated actual overtime expenditures of \$1,431. AOC stated, "it is our determination that the amount of \$1,574 (including Clark's markup) is a fair and reasonable cost for the work of this change order and the contract is hereby amended to reflect this amount."<sup>531</sup> R4, 5958-59. Clark later informed AOC of its disagreement with this determination. R4, 5962.

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<sup>528</sup> AOC's reasoning for this decision was that, "[u]pon review of the "Impacted" schedule, submitted by your January 10, 2000 letter, the work associated with the underground air duct may not have to be expedited to achieve the provisional use date of December 30, 2000." R4, 5952.

<sup>529</sup> Clark also expressed its disagreement with AOC's position that it would be able to achieve provisional use of the low houses by December 30, 2000 without the need to expedite the underground air duct work. R4, 5953.

<sup>530</sup> The documents upon which Mr. Branson relied at hearing to substantiate Kalos' acceleration claim (R4, 5923-48, 5956-57, 5966-6011) were the same ones that Clark had submitted to AOC on March 31, 2000.

<sup>531</sup> In this determination, AOC did not provide for any overhead or profit markup on Kalos' incurred costs. *See* R4, 5958-59.

Appellant argues that Kalos is entitled to recover all the expenses it incurred in furtherance of the acceleration of the air duct installation. Appellant contends that AOC explicitly directed Clark and Kalos to accelerate this work, that Kalos performed the work in an accelerated manner and incurred the costs claimed, and that Kalos' claim is sufficiently substantiated. App. PFF ¶ 427; App. Reply Brief at 88-89. Respondent does not dispute the sufficiency of the amount Kalos claims, but argues that Kalos is not entitled to recover here because AOC was not responsible for the acceleration. Resp. PFF, part 2, § VI.C.

As discussed in detail above, we have determined that any accelerated work performed by Clark and its subcontractors during the Spring of 2000 was not performed pursuant to a compensable constructive acceleration order, given the absence of excusable delay under the contract--a prerequisite to finding constructive acceleration. Accordingly, Kalos' right to recover for the acceleration performed here must be premised upon a specific acceleration order.

Here, Kalos' right to recover from AOC for its acceleration efforts is both established and limited by Change Order No. 66 (quoted above). It is quite unfortunate that both parties here have selectively overlooked essential facts inconsistent with their respective all-or-nothing positions. For example, while Respondent asserts that AOC was not responsible for Kalos' acceleration, it ignores the very existence of a contract change order which governed the manner by which this work was to be prosecuted.<sup>532</sup> Similarly, Appellant disregards the fact that the change order upon which it relies as explicitly directing Clark and Kalos to accelerate installation of the air duct system was not open-ended, but rather, had two key limitations: first, the authorization was for a not-to-exceed amount of \$25,000;<sup>533</sup> and second, the authorization was for "overtime work [and] extended hours during the week and on weekends." R4, 5920. While Clark may have directed Kalos to accelerate installation of the air duct system using whatever means were necessary, AOC's authorization (and, thus, its liability) to the contractor is limited to overtime work up to \$25,000.

Based on our review of Kalos' records, we find that the subcontractor's employees incurred overtime labor costs in the amount of \$7,125.<sup>534</sup> See R4, 5966-6011. We also find that Kalos' records sufficiently demonstrate that the overtime labor costs of its crane vendor were separately accounted for and total \$655. R4, 5923-29. Thus, Kalos is entitled to recover \$7,983 for its acceleration efforts calculated as follows:

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<sup>532</sup> AOC also argues that the acceleration costs should not be paid because the work was not on the critical path. In light of the issuance of Change Order No. 66 directing the acceleration here, whether the air duct installation work performed by Kalos was on the project's critical path is irrelevant to Kalos' right to recover acceleration damages.

<sup>533</sup> The fact that Clark advised AOC, before the costs were incurred, that Kalos' acceleration would exceed the set threshold does not invalidate the express threshold established by the government as Appellant argues. See App. Reply Brief at 88-89.

<sup>534</sup> While, as noted, AOC previously found that Kalos had demonstrated actual overtime expenditures of only \$1,431, it does not appear that AOC considered the cost records submitted by Clark on March 31, 2000.

Overtime Costs	\$7,780 <sup>535</sup>
Overhead	\$778
Profit	\$856
<b>Total</b>	<b>\$9,414</b>
Amount Previously Allowed Kalos <sup>536</sup>	<\$1,431>
<b>Total Amount Due Kalos</b>	<b>\$7,983</b>

### C. Backfill at Glass Houses and Courtyard, Clark Change Order No. 810059

Kalos and Clark seek \$50,892<sup>537</sup> and \$7,852 (not including markups), respectively, with regard to an alleged contract change related to AOC's refusal to allow Kalos to use the #57 bluestone as "engineered fill" to cover the air duct system.

Kalos' scope of work as the site utility and site paving subcontractor included the excavation, installation, and fill of the Botanic Garden's underground air duct system. H.Tr., Branson, 4:234-44. The contract set forth the requirements for the fill materials that the contractor was to use both around and immediately above (*i.e.*, "backfill material"), and then further above (*i.e.*, "engineered fill material"), the air duct system.<sup>538</sup> According to Mr. Branson, Kalos' proposal was based on the use of #57 bluestone for both the backfill and engineered fill requirements over and around the air duct system.<sup>539</sup> *Id.* at 4:239, 256. Kalos' choice of #57 bluestone was based on the fact that the stone would achieve the required compaction rate just by putting it into place without additional efforts. *Id.* at 4:241. Kalos provided a submittal to AOC regarding its intent to use #57 bluestone for the fill requirements, which AOC initially approved.<sup>540</sup> R4, COF 3228-29. AOC, however, subsequently disapproved Kalos' use of #57 bluestone as engineered fill because it found that bluestone did not comply with the requirement that the material not be hazardous to the Botanic Garden's plant life.<sup>541</sup> R4, 1779; COF 3241.

<sup>535</sup> \$7,125 + \$655 = \$7,780.

<sup>536</sup> Mr. Branson testified that no amount had been paid Kalos on this claim. H.Tr., Branson, 14:116. This is a matter for resolution between Clark and Kalos.

<sup>537</sup> The costs actually incurred by Kalos related to this alleged constructive change, together with markups, total \$63,136. App. Exh. 21. Kalos, however, has limited its claim to the amount it had earlier agreed to in negotiations with AOC. H.Tr., Branson, 4:249.

<sup>538</sup> "Engineered fill" is a term of art, used in the construction industry to draw attention to unique contract fill requirements for given areas of the project. H.Tr., Branson, 4:253. The definition of "engineered fill" for this contract is quoted below. R4, K0218.

<sup>539</sup> #57 refers to the size or gradation of the specific stone being used. H.Tr., Branson, 4:238.

<sup>540</sup> Specifically, AOC's response to Kalos' submittal stated, "Approved as noted, subject to contract requirements," and "This product shall not be used in any area to be used as plant bed." R4, COF 3228.

<sup>541</sup> AOC's concern resulted from the fact that the quarried bluestone contained trace amounts of asbestos in it. H.Tr., Coffey, 4:305-06.

Ultimately, AOC approved and Kalos made use of bank run gravel, instead of #57 bluestone, to satisfy the contract's engineered fill requirements. R4, 1778, 1819.

While there was little cost difference between the #57 bluestone and the bank run gravel, H.Tr., Branson, 4:260-61, the choice of bank run gravel as engineered fill necessitated additional efforts by the subcontractor to achieve the required compaction rate, an effort that would not have been required if #57 bluestone were used.<sup>542</sup> App. Exh. 21. Kalos also was required by AOC to install a filter fabric between the backfill and engineered fill layers. R4, 1798. Clark incurred costs associated with soil sampling and testing of the compaction of the bank run gravel utilized by Kalos. R4, 1769-70.

Appellant does not argue that #57 bluestone would not have been hazardous to the Botanic Garden plants.<sup>543</sup> Instead, Appellant asserts that the rejection of the bluestone was a constructive change because (1) Kalos intended to use the #57 bluestone originally; (2) AOC had approved it originally, (3) bluestone is frequently used for fill, and (4) Kalos' suppliers informed the subcontractor that bluestone met the contract requirements here. App. PFF ¶ 663. Respondent argues that AOC's rejection of the bluestone that Kalos originally planned to use was not a change because the material did not meet the contract requirements. Resp. PFF, part 5, tab I, at 4.

In determining whether a constructive change occurred here, it is not relevant that Kalos intended to use the bluestone originally, that AOC had approved it originally, that bluestone is frequently used in construction projects, or that Kalos' suppliers informed the subcontractor that bluestone met the contract requirements. Instead, our determination is based on whether the #57 bluestone that AOC rejected in fact conformed to all applicable contract requirements. See *A&D Fire Protection, Inc., supra*, at 158,448 (a contractor is entitled to an equitable adjustment for a constructive change when required to perform more or different work not called for under the terms of its contract as a result of the government's misinterpretation of specifications).

The contract's earthwork specifications set forth the requirements for various fill materials, including engineered fill and backfill. Specifically, "engineered fill" was defined as "subbase or base materials," which in turn was defined as:

Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940,<sup>544</sup> with at least 95 percent passing a 1-1/2 inch sieve and not more than 8 percent passing a No. 200 sieve.

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<sup>542</sup> Bank run gravel contains sand and clay that bluestone does not, thereby requiring manual efforts to achieve the same density rate. H.Tr., Branson, 4:241-42. Additionally, Kalos ended up using #67 gravel (and not #57 bluestone) for the contract's backfill requirements; the change in backfill materials is not part of Kalos' claim here. See H.Tr., Branson, 4:283-85.

<sup>543</sup> The record in fact suggests that Clark agreed with AOC's determination that use of the #57 bluestone would have adversely affected the health of the Botanic Garden's plants. See R4, 1819.

<sup>544</sup> ASTM refers to the American Society for Testing and Materials. ASTM D 2940 refers to the Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports. Neither party has asserted that ASTM D 2940 is relevant to the determination here.

R4, K0218. While another earthwork specification precluded the contractor's use of fill material containing "deleterious matter," that provision applied only to the contract's "backfill requirements," and not to the contract's "engineered fill" requirements that are at issue here. *Id.* Quite simply, while AOC may have had a valid interest in protecting the Botanic Garden's plant life from "deleterious matter," the provision prohibiting material containing such material did not here govern the contractor's choice of "engineered fill" material.

AOC also argues that Kalos' choice of bluestone for engineered fill did not meet the aforementioned engineered fill specification because it did not contain natural or crushed sand. Resp. PFF, part 5, tab I, at 1. According to Mr. Coffey of DMJM, the #57 bluestone that Kalos planned to use as engineered fill failed to meet the applicable specification because the bluestone was not engineered to come with any sand content. H.Tr., Coffey, 4:310-11.

We first note that the argument advanced here by AOC--that the bluestone failed to contain any natural or crushed sand is *post hoc* and was not part of the reason why AOC rejected Kalos' use of bluestone originally. *See* R4, 1819-20. In any case, we find AOC's interpretation of the applicable contract provision to be in error. When a dispute arises as to the actual meaning of a contract provision, we will resolve the matter by reading the contract as a whole and in a manner that give effect to all provisions. *Coast Federal Bank, FSB v. United States*, 323 F.3d 1035, 1038 (Fed. Cir. 2003). In our view, the only reasonable interpretation of the engineered fill specification is that the mixture could contain gravel, stone, and sand, and not, as Respondent contends, that it was required to contain all three materials in order to be acceptable. This reading is further supported by the fact that the specification established a maximum, but no minimum, percentage level of sand for the overall mixture (*i.e.*, "not more than 8-percent passing a No. 200 sieve").<sup>545</sup> *See* H.Tr., Branson, 4:275, 328-29. In sum, we find that Kalos' planned use of the #57 bluestone for the contract's engineered fill requirements complied with all applicable contract provisions and that AOC's rejection thereof constituted a constructive change.

Kalos' claim here is supported by a detailed breakdown of its labor, equipment, and material costs it incurred regarding installation of the filter fabric and the compaction of the bank run gravel.<sup>546</sup> App. Exh. 21, *see* R4, 1865-67. Mr. Branson also testified that he reviewed Kalos' time sheets and invoices for the claimed material and equipment costs and compaction-related labor. H.Tr., Branson, 4:249-50. We find Kalos may recover its claimed \$50,982 for this change claim, as Kalos has established its reasonable damages associated with this change.

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<sup>545</sup> Mr. Branson also testified that the #57 bluestone, even if washed, contains trace amounts of sand. H.Tr., Branson, 4:272-73. Mr. Coffey of DMJM concurred that small amounts of sand would occur naturally as part of bluestone. H.Tr., Coffey, 4:325.

<sup>546</sup> While AOC denied Kalos' claim in part because of its belief that the use of #57 bluestone would have required the same compaction efforts as those for the bank run gravel, R4, 1794, Mr. Coffey testified that the bank run gravel approved by AOC as engineered fill did not in fact compact as well as the #57 bluestone. H.Tr., Coffey, 4:312-13.

Clark also claims the costs it incurred related to the change in the engineered fill materials. R4, COF 3334. Specifically, Clark alleges that the additional compaction efforts associated with use of the bank run gravel resulted in labor, equipment, and testing costs for soil sampling. H.Tr., Sullivan, 4:293-94. In addition to a written summary of its costs, Mr. Sullivan testified that Clark's claim was based on the monthly invoices it received (and paid) from testing vendor, EMSI Engineering, Inc. *Id.* at 4:301. Mr. Sullivan explained that the soil sampling and equipment costs were based on invoices that specifically identified the bank run soil sample tests. *Id.* at 4:302. Similarly, Clark was separately billed by its testing vendor for the claimed clerical personnel costs. *Id.* at 4:301. Clark also determined that although the testing technician performed work on the project generally, his primary effort during the period of time during which Kalos performed compaction work for the engineered fill was soil testing. *Id.* at 4:299-302. Based on our review of the record, we find Clark is entitled to recover the \$7,852 claimed.

**XVIII. MEGACO'S CLAIMS**

Megaco was the lead abatement, painting and brick repair subcontractor. C4 Supp. 08 0359. Megaco seeks \$3,909 in acceleration damages and \$18,418 in delay damages. App. Exh. 139, attach. 10. Megaco has also filed a number of change claims.

**A. Acceleration Claim**

Megaco claims \$3,909 in acceleration damages. App. Exh. 139, attach. 10. Megaco asserts that by letter dated March 2, 2001 it was ordered by Clark to accelerate its painting work on the South Addition portion of the facility. C4 Supp. 08 0327. Specifically, Megaco argues that Clark directed it "to proceed with taking all necessary measures, including but not limited to, additional equipment, additional manpower, increased work hours and additional shifts" to comply with the prime contractor's accelerated schedule. *Id.* at 0329. Megaco alleges that it then accelerated its performance and incurred premium (overtime) costs associated with its painting work. *Id.* at 0327. Megaco's acceleration claim seeks the premium costs it incurred to perform the painting of the South Addition. *Id.* Megaco formatted its revised claim as follows:

Painter (131 hours @ \$22.50 premium rate)	\$2,948
Overhead & Profit (22.6% and 10%)	\$961
<b>Total</b>	<b>\$3,909</b>

*Id.* at 0334. Megaco provided vendor invoices and its own daily work logs in support of the number of hours claimed. *Id.* at 0335-42.

We find Megaco is entitled to recover for its acceleration efforts here. The record sufficiently establishes that Megaco actually accelerated its work pursuant to a Clark acceleration order implementing the constructive acceleration cure notice issued by AOC to Clark on February 5, 2001.<sup>547</sup> We also find that Megaco's claimed overtime costs are sufficiently supported by the

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<sup>547</sup> In view of the general acceleration of the project that was necessary in order to complete this project as soon as possible and the constructive acceleration order by AOC, we find no merit to Respondent's

record. However, its claimed overhead is limited to 10 percent as required by the contract. R4, K0188. Thus, Megaco's allowable acceleration costs total \$3,567.<sup>548</sup> As discussed above, since the subcontractor's acceleration damages flowed from concurrently caused delay, we determine the allowable acceleration damages based upon how much of the total contract delay was excusable. We therefore find that Megaco is only entitled to recover 122.4/421 of \$3,567, or \$1,037, in acceleration damages.

## B. Delay Claims

Megaco has submitted two separate claims for delay damages totaling \$18,418: one for repriming the steel doors and one for brick replacement. App. Exh 139, attach. 10.

### 1. Steel Door Repriming

Megaco claims delay damages of \$5,126 for scraping and prime-coating the 40 new steel doors for the South Addition from February 14 through February 16, 2001. C4 Supp. 08 0343-52. Megaco's contract required it to paint the South Addition steel doors. *Id.*; H.Tr., Short, 2:318. The steel doors were new when purchased and were factory-primed. C4 Supp. 08 0343. Megaco alleges that the doors were damaged at the job site prior to installation, and that Clark directed the subcontractor to clean and reprime the steel doors. *Id.*; H.Tr., Short, 2:318. According to Megaco, "Clark insists this damage was clearly due to project delays by the AOC." C4 Supp. 08 0343. As part of its claim Megaco provided daily logs to substantiate the time and supplies spent completing this work. *Id.* at 0347-52.

Appellant has not proved its entitlement to delay damages here, as it has failed to establish that the scraping and prime coating that Megaco performed was the result of government-caused delay. In this regard, the work performed here involved only the South Addition, which was not part of the project's critical path and was not impacted by critical path delays. Moreover, neither Megaco nor Clark has provided any evidence of a separate government-caused delay here. Also, Megaco's representative, Mr. Short, testified that the subcontractor performed the sanding and prime-coating work, but provided no evidence as to the reason why this was necessary.<sup>549</sup> H.Tr., Short, 2:318. Similarly, Mr. Sullivan testified that early delays to the South Addition prevented the doors from being installed for several months (thereby causing the doors to be exposed to the weather in the interim), but he also did not state the cause of such delays.<sup>550</sup> H.Tr., Sullivan,

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argument that Megaco's work must be on the project's critical path in order for it to recover acceleration damages.

<sup>548</sup> \$2,948 + \$295 (10% overhead) + \$324 (10% profit) = \$3,567.

<sup>549</sup> Both Megaco's and Clark's representatives testified that Clark has paid Megaco for refurbishing South Addition doors that were exposed to weather for extended periods of time. H.Tr., Short, 2:318; Sullivan, 2:274-75.

<sup>550</sup> In its post-hearing brief, Clark cites to the testimony of Mr. Sullivan for its proposed finding that "[t]he doors arrived on site but could not be installed because the Project had been delayed." App. PFF ¶ 453. In its reply brief, Clark, again citing to the testimony of Mr. Sullivan, contends that "[b]ecause of the AOC caused delays to the work, the doors could not be installed during the planned time and were stored

2:273-75. Finally, in support of this claim, Mr. Dylus testified at the hearing that Megaco's delay claim dealt primarily with the delay associated with the revised lead abatement procedures (not the South Addition). H.Tr., Dylus, 22:169-70. Appellant has simply provided no evidence establishing AOC's liability for the delay damages claimed here.

## 2. Damaged Brick Repairs

Megaco also claims as "delay" damages a total of \$13,292 for damaged brick repair work, performed either by itself or by another company, United Masonry Incorporated. This claim is actually for acceleration damages. Megaco asserts that during the course of the project, the Garden Court and Orangerie walls were damaged on numerous occasions by other subcontractors and/or by Clark. C4 Supp. 08 0353. Megaco contends that, by letter dated June 3, 2001, Clark directed it to patch and repair the brick damaged by various subcontractors "as a result of the acceleration operation." *Id.* at 0353-55. Megaco completed this work. Clark then contracted with United Masonry to repair additional brick damaged by other contractors after Megaco had completed the initial damage repairs, which work Megaco asserts was also the result of the government acceleration.<sup>551</sup>

Appellant has shown that compensable acceleration efforts caused the Garden Court brick walls to be damaged. There is no evidence in the record regarding what damage occurred, the method by which the damage occurred, or how the damage was linked to Clark's acceleration efforts. No representatives of Megaco or Clark provided testimony regarding Megaco's acceleration claim or the underlying causes. Additionally, while Clark's directive to Megaco states that the brick damage was as a result of acceleration, C4 Supp. 08 0355, it provides no explanation or support for this conclusion.<sup>552</sup> Moreover, with regard to the brick repair work performed by United Masonry claimed here by Megaco, the record indicates that Clark deducted the cost of this work from Megaco's subcontract price because of Clark's determination that, "[t]his work was originally included in Megaco[s] scope of work." *Id.* at 0358. In sum, we find that Appellant has not sufficiently established that the costs claimed here by Megaco were the result of AOC's February 5, 2001 constructive acceleration order. This claim is denied.

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onsite." App. Reply Brief ¶ 102. We find that the cited testimony of Mr. Sullivan does not establish that the delays to the South Addition were in fact caused by AOC.

<sup>551</sup> Clark deducted the cost of the work performed by United Masonry (\$4,386) from Megaco's contract price. C4 Supp. 08 0358. Megaco's claim includes the amount deducted from its contract price by Clark (\$4,386) plus 10 percent markups for both overhead and profit. *Id.* at 0353.

<sup>552</sup> While Clark now contends that, "[a]s the workforce increases in size and the amount of equipment on site increases, there is increased damage to completed work," App. PFF ¶ 456, it cites no support in the record for this assertion. Moreover, Clark provides no evidence that this general proposition was in fact applicable to the brick repair work performed and claimed by Megaco here. While it is quite possible that an accelerated performance could result in unintentional damage to finished work, it is not our role to make such assumptions, but to determine whether there is evidence that this was the case.

### C. Brick Replacement, Clark Change Order No. 810093

Megaco claims \$53,280 (including applicable overhead and profit markups) for the replacement of bricks in the Garden Court and the Orangerie. H.Tr., Short, 2:111; *see* R4, 3904. Megaco's total claim for this work is actually \$80,458, but on September 5, 2000, AOC, by Change Order No. 110, unilaterally amended the contract in the amount of \$29,896 (\$27,178 for Megaco after accounting for Clark's markup); Megaco's claim is thus for the difference (\$80,458 - \$27,178 = \$53,280). H.Tr., Short, 2:111; R4, 4028.

This claim has a very complicated background and we outline here only the most pertinent facts. In 1999, it was determined that a lot of brick in the Garden Court and Orangerie was "structurally falling apart" and was unsalvageable. H.Tr., Sullivan, 2:70. This resulted in a series of discussions about this and other issues relating to the brick. As relevant to this claim, DMJM took a variety of photographs in August 1999, and circled the areas where there was deteriorating brick and holes in the walls where brick needed to be replaced or installed. *Id.* at 2:71-72; Metzler, 2:171; R4, 3982-4023.

This ultimately resulted in RFI No. 395 on March 7, 2000, where Clark referenced the photographs and requested that AOC "provide the scope of brick replacement in the Orangerie and Garden Court." R4, 3953. In response, on March 27, AOC requested Clark to provide costs to replace brick in the "major large areas" and a "unit cost for all additional brick repairs and replacements." R4, 3954. AOC also stated, "DMJM will provide guidance in the field regarding which brick to repair and which brick to replace."<sup>553</sup> *Id.*

On April 5, 2000, Megaco provided a proposal in the amount of \$62,446 based on replacing an estimated 1,465 bricks with a unit price of \$42.62 (\$62,446/1465). R4, 3894-95. This proposal was based upon estimated costs supported by a detailed breakdown of the associated labor and equipment costs. *Id.* The 1,465-brick estimate was based on a "rough count" made by an on-site review by a Megaco and a Clark representative of the areas that had been circled by DMJM on the photographs. H.Tr., Sullivan, 2:84; Short, 2:144.

Mr. Metzler of AOC analyzed the DMJM photos and circled 31 areas on the photos where bricks were to be replaced, and developed a spreadsheet that assigned the extent that he found the brick replacement in each area was covered by the contract or was changed work; his spreadsheet

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<sup>553</sup> There were also discussions regarding the "reinstallation of brick on the horizontal steel beams above the Garden Court," and providing infill at three Garden Court north wall cabinet locations where there was "existing steel lintel that is rusted and sagging" (for which issue Clark requested whether it should remove "the center piers between these three infills" and "fill in one larger area.") R4, 3952-54. While AOC suggests that some of the brick costs in this change claim were for this other work that had been accounted for under separate change orders, Mr. Short, Megaco's representative, has persuasively testified that the brick count on which this claim is based did not include the brick for these other changes. *See* H.Tr., Short, 2:123, 134-40; *see also* H.Tr., Sullivan, 2:72, 76.

indicated that approximately 62 percent of labor hours were for change work.<sup>554</sup> H.Tr., Metzler, 2:171-77; R4, 3906-27.

In response, on June 16, 2000, Frank Ferrucci of Clark prepared his own analysis of the areas analyzed by Mr. Metzler, in which he estimated that approximately 90 percent of the labor hours were for change work and the remainder was for contract work. R4, 3905. The 16 areas that Clark indicated may be partially for contract work were areas where Clark had removed purlins; Megaco/Clark estimated the 4 bricks that surrounded each removed purlin for each of these 16 areas (a total of 64 bricks) related to the removal of the purlins. *Id.*; H.Tr., Sullivan, 2:90-92; Short, 2:124-26. Mr. Ferrucci also provided a response as to why he believed work, involving the infilling of voids created by the removal of electrical equipment, which Mr. Metzler found to be contract work, was not required by the contract. R4, 3902-04. Finally, Clark scrubbed Megaco's costs, and Megaco submitted a revised proposal of \$48,634 for replacing the 1,401 bricks (1,465 – 64) with a reduced unit price of \$34.71 per brick. R4, 3905; H.Tr., Sullivan, 2:78.

This revised proposal became the basis for negotiation in August 2000, which culminated in a tentative settlement of \$52,601 (\$47,819 for Megaco). R4, 4030-31. However, AOC did not execute this settlement because of concerns that some of the equipment included in Megaco's estimate was not being used in the brick replacement. *Id.*

Meanwhile, Megaco continued replacing brick in the Orangerie and Garden Court as directed by DMJM through October 2000. H.Tr., Short, 2:120, 143. Megaco's lead mason kept a running count of the number of bricks that were replaced for this changed work. *Id.* at 119-20. The lead mason's documented count of the actual number of bricks replaced totals 2,382 bricks. App. Exh. 7. Mr. Short explained that the discrepancy between the 1,465 and 2,382 brick counts was caused by the vagaries of estimating from the ground, and Megaco's and DMJM's identification of new areas in the deteriorating Orangerie and Garden Court walls where brick had to be replaced. H.Tr., Short, 2:119-20. On December 5, 2000, Megaco submitted a claim for the total 2,382 bricks replaced, less the 64 bricks relating the removal of the purlins, at a \$34.71 per brick unit price. R4, 4025.

AOC does not specifically take issue with the reasonableness of the \$34.71 unit price for replacing the bricks, and the Board determines, based on its review of the record, that this is a fair and reasonable unit price. AOC also accepts the accuracy of 2,382 brick count. H.Tr., Metzler, 2:153.

However, AOC continues to assert that some of the replaced brick was required by the contract and does not represent changed work. In support of this assertion, AOC relies upon the general contract requirements that the contractor is responsible for "cutting and patching" work that involves the removal and installation of any structural component or piece of equipment, including protecting "adjacent installation." R4, K0035, K0950. This "cutting and patching" includes the installation of "equipment and materials" as well as the removal of "selected

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<sup>554</sup> Mr. Metzler was accepted by the Board, without objection, as an expert in "general contracting." H.Tr., Metzler, 2:152.

electrical equipment” and “mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the new Work,” while protecting “the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.”

R4, K0950-51, K1321. With regard to the brick in the Orangerie and Garden Court, the contract, as amended, provided in pertinent part that the brick “restoration” shall consist of “repairing damaged stone and brick masonry,” and “patching anchor holes from removed items, filling cracks in bricks to prevent water infiltration and replacement of spalled face brick.”<sup>555</sup>

R4, K0454. Finally, under the selective demolition section of the specifications, the contractor is required to:

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
- B. Patching is specified in [R4, K0035].
- C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
  1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer’s printed recommendations.
- D. Restore exposed finished of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
- E. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance.

R4, K0208.

We have identified three general areas where Mr. Metzler has asserted that the Megaco brick count included contract work. First, Mr. Metzler’s analysis of the DMJM photos indicated that a greater number than the four bricks per purlin credited by Megaco were implicated by the removal of the purlins. R4, 3906. Mr. Short, who oversaw the Megaco work, provided an in-depth explanation as to why four bricks per purlin was a “good faith” estimate of the affected bricks. H.Tr., Short, 2:124-30. In contrast, Mr. Metzler did not identify a specific number of bricks per purlin that he believed would be implicated by its removal, but assigned a percentage (50 or 70 percent) of the work in the area around the particular purlin that he believed was “contract work;” while Mr. Metzler referenced the applicable contract provisions, he did not explain the basis for the particular percentages he assigned each affected area, except to note that the removal of the purlins might have caused additional damages and that this was a “judgment call.” R4, 3906-27; H.Tr., Metzler, 2:178-81. Under the circumstances, we credit Mr. Short’s testimony and accept as appropriate Megaco’s 64-brick credit for the areas affected by the removal of the purlins.

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<sup>555</sup> Spalled brick is brick with chips broken from it or with the face separated, and is to be “replaced,” in this case, repaired, “by removing a depth of approximately three inches (3”) of the spalled brick” in order to be considered contract work. R4, K0466; H.Tr., Metzler, 2:222-23. If the brick is totally replaced, that would be considered change work. See H.Tr., Metzler, 2:205-06.

The second area concerns the brick needed to infill the voids in the brick wall caused by the removal, during demolition, of two electrical panels and a public address system from the north wall of the Garden Court, which work Mr. Metzler found was 100-percent contract work (and not change work). R4, 3906, 3908, 3910, 3912; H.Tr., Metzler, 2:182-84. Mr. Ferrucci's June 16, 2000 letter specifically took exception with Mr. Metzler's determinations in this regard, asserting, "[t]he specification does not deal with voids or cavities left after the removal of panels or devices." R4, 3902. Mr. Ferrucci also stated that although the drawings require the infill by brick of the voids created by some of the removed electrical panels, there was no such requirement imposed by the drawings for the panels and equipment in question here, and "it appeared obvious that AOC did not intend these other areas to be in-filled with matching brick." R4, 3903. Mr. Metzler does not specifically respond to Mr. Ferrucci's comments, but simply states that the specifications set out above required these voids or cavities be infilled with brick. See H.Tr., Metzler, 2:182-84.

Our review of the contract drawings shows that Mr. Ferrucci was correct in asserting that while the Drawing A010, Architectural Demolition Floor Plan, showed that the electrical equipment on the north wall of the Garden Court was to be removed, Drawing A109 only states, "fill closets & niche w/brick to match existing" with regard to the removed electrical equipment on the west side of the north wall of the Garden Court and had no similar designation with regard to the electrical equipment in question here, which was on the east side of the north wall of the Garden Court. R4, 3903; Drawings A010, A109. Moreover, contrary to Mr. Metzler's implication, there is no specification that states that voids left by the removal of equipment are considered "cutting and patching," and therefore the contractor's responsibility, except to the extent that adjacent areas are damaged by the removal of the equipment, which has not been alleged here. Thus, we find that filling these voids with brick constituted a change to the contract.

The third area of contention was based on Mr. Metzler's analysis of certain photographs taken by Clark of the areas that it indicated were covered by this change. Resp. Exh. 4. Based on his review of these photographs, Mr. Metzler found evidence of brick replacement apparently caused by (1) installation or removal of a monumental door, H.Tr., Metzler, 2:192-93; Resp. Exh. 4, photo 5; (2) installation of thermostats and the conduit leading to them, H.Tr., Metzler, 2:193-95, Resp. Exh. 4, photos 6, 20; (3) cutting of a chase in the wall for electrical conduits, H.Tr., Metzler, 2:194, Resp. Exh. 4, photo 8; (4) installation of a key switch, H.Tr., Metzler, 2:194, Resp. Exh. 4, photo 18; and (5) installation of a fire alarm box, H.Tr., Metzler, 2:194-95, Resp. Exh. 4, photo 19. Appellant has provided no rebuttal to Mr. Metzler's testimony.

Based on our review of the specifications and Mr. Metzler's testimony, we find that the bricks implicated by these last examples were contract work and cannot be recovered as a change. While neither Mr. Metzler nor any other AOC representative has done an on-site replaced brick count, H.Tr., Metzler, 2:219, based on our review of the above-cited photographs, we find a total of 142 bricks were implicated. While it may be that there is other contractually required work included in the total Megaco brick count, we are unwilling to follow Respondent's suggestion that we go beyond the examples identified by Mr. Metzler, given the limited nature of Respondent's investigation of this matter.

Accordingly, we disallow \$4,929 (142 x \$34.71) of Megaco's change claim, and find that Megaco is entitled to recover \$48,351 under this change claim.<sup>556</sup>

**D. Additional Drywall Painting in South Addition, Clark Change Order No. 810365**

Megaco claims \$12,182 for painting drywall in various rooms in the South Addition, which it contends the contract did not specify should be painted. App. Exh. 10; H.Tr., Sullivan, 2:247-48; Short, 2:283. The rooms on the first floor of the South Addition, where Megaco asserts that painting of the drywall was not required, were the east corridor, east vestibule, lobby, conservatory manager, conservatory engineer, lunch room, west corridor, west vestibule, catering, volunteers, janitor, stair No. 1, and stair No. 2. App. Exh. 10.

The applicable contract drawings do not show that the drywall in these rooms in the South Addition was to be painted. Drawings A601 and A602, which contain the details concerning the construction of the South Addition show the installation of drywall in these rooms, but do not specify that they are to be painted. H.Tr., Short, 2:307-08. Drawing A003, entitled "Room Finish Schedule," shows that the walls of these rooms were "gypsum wall board," but did not specifically designate that they would be painted, although some of the walls for other rooms in the South Addition (plant receiving, flammable material closets, and mixing room) were shown to have a "water borne epoxy" (a paint-like substance) applied. *Id.* at 2:284, 305-07.

However, section 9900 of the contract, which specified the painting requirements for the contract, including for "gypsum board systems," *see* R4, K0835, provided in pertinent part:

Paint exposed surfaces and surfaces exposed by (sic) including but not limited to field cutting, drilling and welding whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. . . . Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

R4, K0834. This section further states:

The term exposed surfaces includes areas visible when permanent or built-in fixtures, convactor covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provided desired protection.

R4, K0844. This section also designated the primers and interior finish paint materials to be used on the gypsum drywalls. R4, K0839, K0841. In addition, this section contains an "Interior

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<sup>556</sup> \$53,280 - \$4,929 = \$48,351.

Paint Schedule,” which specifies the types and coats of primer and paint to be used on “gypsum drywall systems.”<sup>557</sup> R4, K0847.

On April 20, 2000, Clark submitted RFI No. 434, which requested AOC to “confirm which items on the finish schedule are still applicable.” R4, COF 4674. In response, on April 25, AOC provided a “Finish Schedule,” which stated that “all items on the finish schedule are still applicable with the exception of the following clarifications,” which included, among other things, the designation of what paint was to be used to cover the drywall in the South Addition rooms in question here. *Id.*

Megaco essentially argues that this designation of the paint to cover the drywall in these areas constituted a change to the contract because Megaco interpreted Drawings A003, A601 and A602 as indicating that the drywall walls of the rooms in question here would remain unpainted.

Megaco’s interpretation of the specification fails to consider the specification requirement that “all exposed surfaces,” including drywall, be painted, even if the color or finish is not designated. Megaco’s representative indicated no familiarity with this specification when it was brought to his attention at the hearing, *see* H.Tr., Short, 2:315, and Clark provided no response in its post-hearing submissions to AOC’s assertion that this specification requires that the drywall in question to be painted in accordance with section 9900. Clark also does not argue that the paint designated on the “Finish Schedule” provided in response to RFI No. 434 was inconsistent with that specified in section 9900. Therefore, we find that the contract required Megaco to paint the drywall in the rooms in question and deny its change claim.<sup>558</sup>

#### **E. Additional Painting in South Addition Basement, Clark Change Order No. 810313**

Megaco claims \$3,220 for painting concrete masonry units (CMU) comprising the walls of the men’s and women’s locker rooms in the South Addition basement, which it contends were not specified to be painted by the contract. App. Exh. 11; H.Tr., Sullivan, 2:253.

Drawing A003, entitled “Room Finish Schedule,” indicates that the walls of all of the rooms in the South Addition would be “masonry, painted,” except for the men’s and women’s locker rooms, for which this schedule only showed the walls were a “ceramic tile system.” However, details C2, C6, C9, C13 and C17 of Drawing A602 depicted both the ceramic tile system and “painted CMU” walls in the men’s and women’s locker rooms.

Megaco asserts that under the order of precedence clause included in this contract, the “Room Finish Schedule” takes precedence over the drawings and it was therefore not required to paint the concrete masonry walls of the men’s and women’s locker rooms. This clause states:

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<sup>557</sup> Section 9900 was amended during contract performance by Change Order No. 42 on September 23, 1999, H.Tr., Sullivan, 2:255-56, but these changes are not material to this change claim.

<sup>558</sup> Megaco’s primary argument here that the “Room Finish Schedule” on Drawing A003 takes precedence over the other drawings fails to consider the section 9900 contract requirements.

Overlapping and Conflicting Requirements: Where there appears to be overlapping or conflicting requirements in the drawings and specifications, the order of precedence established as follows:

1. Order of Precedence: Any inconsistency in this solicitation or contract shall be resolved by giving precedence in the following order:
  - a. The Schedule (excluding the specifications).
  - b. Representations and other instructions.
  - c. Contract clauses
  - d. The specifications
  - e. The drawings. Large scale drawings take precedence over small scale drawings.

R4, K0107-08.

Megaco is not properly interpreting the term "The Schedule" as used in this clause. "The Schedule" in this contract is clearly labeled as such, and contains the descriptions and prices for the basic contract line items. R4, K0024-26. In this regard, we note that the clause used here is identical to that at FAR § 52.215.9, which is specified for use in supply and service contracts, except that in this contract the paragraph addressing "drawings" has been added to the bottom of the list in the clause. In interpreting the clause at FAR § 52.215.9 and its predecessors, boards of contract of appeals have recognized that "The Schedule" is that part of the contract where the contract prices and rates and the other Schedule provisions are contained and that "The Schedule" takes precedence over the other contract provisions. *See, e.g., Navcom Defense Electronics, Inc.*, ASBCA No. 50767 *et al*, July 25, 2001, 01-2 BCA ¶ 31,546 at 155,733,34; *CRC Sys. Inc.*, GSBCA No., 11172, February 26, 1993, 93-2 BCA ¶ 25,842 at 128,604 n.6; *cf. W.M. Schlosser Co., Inc.*, GSBCA No. 11079, July 30, 1991, 91-2 BCA ¶ 24,258 (interpreting contract containing order of precedence clause that expressly gave precedence to schedules contained on contract drawings over conflicting information on contract drawings). The fact that the term "The Schedule" in the order of precedence clause included in this contract did not refer to schedules on drawings is further substantiated by the definition of "drawings" included in the contract. This definition states:

The term "drawings" means the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, that show the design, location and dimensions of the Work, and generally includes plans, elevations, sections, details, schedules and diagrams.

R4, K0032. That is, under the order of precedence clause here, schedules on drawings are simply part of the drawings and are given no precedence over other aspects of the drawings.

Based on our review of the drawings, we find the contract clearly contemplated that the cement walls of the men's and women's rooms would be painted. In this regard, the pertinent details of Drawing A602 showed precisely where the painted CMUs and ceramic tile systems were located

in the locker rooms. The fact that the blanks for these rooms were not checked on the Room Finish Schedule on Drawing A003 as having "masonry, painted" walls does not render meaningless the explicit guidance in the pertinent details of Drawing A602, particularly given the section 9900 specification requirement that all "exposed surfaces," including cement walls, be painted. R4, K0834, K0838-39, K0846. In sum, we find that Megaco is not entitled to recover for this change claim.

#### **F. Credit for Purlin Painting, Clark Change Order No. 810089.**

Megaco claims \$9,173 for the assertedly excessive credit taken by AOC for painting purlins when this work was deleted from the contract. H.Tr., Short, 2:291. This amount represents the difference between the \$11,040 credit for Megaco's work taken by AOC and Megaco's \$1,867 estimate of what it considered to be the proper credit.<sup>559</sup> *Id.*; R4, 3840, COF 5836.

The original contract called for removing existing purlins from the structure, cleaning them, painting the ends with bituminous paint, and reinstalling them. H.Tr., Short, 2:288. However, after some efforts at cleaning the purlins, it was determined that the purlins did not clean up well enough to be reused, and that new purlins would be acquired and installed. *Id.* Consequently, AOC issued Change Order No. 48 ordering this change. R4, 3836.

The deleted work that is at issue here was the painting of the ends of the purlins with bituminous paint by Megaco. The purlins were 8-foot long and the ends were 4-inches by 4-inches. H.Tr., Sullivan, 2:251; Short, 2:290, 317. There were a total of 701 purlins that needed the ends painted with bituminous paint. R4, 3839. The bituminous paint was necessary to separate the dissimilar metals of the purlins from the metal to which they were connected. H.Tr., Sullivan, 2:251.

Mr. Short of Megaco testified that its plan was to transport the purlins to its local facility, lay them out on benches in large groups (Megaco's estimate was doing 60 purlins at a time), wipe the ends with solvent, apply a coat of bituminous paint to the four-inch by four-inch ends with a roller or brush, wait a couple hours, and then apply a second coat of paint. H.Tr., Short, 2:290, 292-93. Mr. Short estimate of \$1,867 was based on the assumption of 60 purlins would be painted per day in its facility using one painter. R4, COF 5836. In contrast, AOC's estimate of \$11,040 is based on the assumption "that 2 painters will take 15 minutes per purlin to set up the purlin, apply one coat of bituminous paint and then set aside to dry. Then since two coats are required, say one man hour per purlin." R4, 3840.

Mr. Short characterizes AOC's estimate as "outrageous" and states that his "grandfather can do 60 a day." H.Tr., Short, 2:289. Mr. Sullivan also stated his belief that Mr. Short's estimated credit was overly generous. H.Tr., Sullivan, 2:250. AOC provided no witness to defend its estimate. Based on our review, we find Megaco's labor cost estimate here to be reasonable and AOC's estimate to be unsupported and unreasonable.

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<sup>559</sup> We note that Clark's final revised claim erroneously shows the claim amount as a credit due AOC of \$1,900. App. Exh. 139, attach. 8. This does not account for the credit that AOC already took under the contract or reflect Megaco's \$1,867 estimate.

In its post-hearing brief, AOC contends that Megaco's estimate is flawed because it did not account for the time needed to lay out the purlins and apply the solvent. Resp. PFF, part 6, tab VII, at 2. As noted above, it is AOC's burden to show the appropriate deductive credit because of this change. See *Nager Elec. Co. v. United States*, 194 Ct.Cl. at 853; *F.E.I., supra*, at 137,628. Since AOC has provided no evidence of the costs of these additional tasks and we can find no evidence in the record to make any such determination, we find no basis to adjust Megaco's estimate to account for these factors.

Therefore, Megaco is entitled to recover \$11,099 under this change claim for the excessive credit taken by AOC, calculated as follows:

Excessive Credit	\$9,173
Overhead (10%)	\$917
Profit (10%)	\$1,009
<b>Total</b>	<b>\$11,099</b>

#### G. Door Punchlist Painting, Clark Change Order No. 810427

Megaco claims \$1,371 for putting an additional third coat of paint on various doors. App. Exh. 12; H.Tr., Short, 2:297. This asserted change arose during the "punch list completion list" review of the painting in the facility. H.Tr., Sullivan, 2:278. During that review, AOC indicated to Clark that some of the doors were not sufficiently covered and that another coat should be applied. *Id.* at 2:255, 278-80. Mr. Sullivan stated that based on his inspection of the doors, all needed an additional coat and that Clark ordered Megaco to do this work. *Id.* at 2:256, 277-80.

Mr. Sullivan explained that while the original specification required four coats of paint for these doors, Change Order No. 42, issued on September 23, 1999, amended this specification to require two coats of paint for the doors. *Id.* at 2:253-54. However, Mr. Sullivan testified that it was evident after the two coats had been applied that this was insufficient to cover the doors, and the fact that four coats were originally specified evidences that AOC/DMJM knew that two coats were insufficient. *Id.* at 2:256. Megaco thus asserts that applying this additional coat constituted a constructive change to the contract. See App. PFF ¶ 588.

To recover under a constructive change theory, the contractor must show that the alleged additional work was performed pursuant to government direction or as a result of government fault. *C.H. Hyperbarics, Inc., supra*, at 161,147. A contractor who acts as a volunteer cannot be paid for extra work which is furnished on its own initiative. *Id.*

As indicated, Mr. Sullivan testified that AOC only directed an additional coat be applied to some of the doors and Clark on its own initiative painted the other doors. H.Tr., Sullivan, 2:277-81. Given that many of doors evidently received an extra coat of paint at Clark's own initiative, without obtaining any direction from AOC, we conclude that Clark was acting as a volunteer and may not recover under a constructive change theory. While the record shows that some of the doors were directed to be repainted by AOC, *id.* at 2:255, Mr. Sullivan, when asked to estimate a "rough order of magnitude" as to how many of the doors AOC directed be repainted, testified

that it be only speculation on his part to make any such breakdown. *Id.* at 2:280-81. We deny Megaco's change claim.

## **XIX. LORTON'S CLAIMS**

Lorton, Inc. claims delay damages in the amount of \$123,934<sup>560</sup> and acceleration damages in the amount of \$17,814. App. Exh. 105. Lorton, a stone company in the Washington, D.C. area, was a subcontractor to Clark for the stone and stone walkway areas of the Botanic Garden renovation. H.Tr., Dylus, 22:167. Lorton has also made several change claims that we consider here.

### **A. Delay Claims**

As indicated, Lorton claims \$123,934 in delay damages. App. Exh. 105. Based on the original project schedule, Lorton anticipated that its work on the renovation contract would last a total of 37 weeks, and end by July 7, 2000. C4 Supp. 13 0259. Lorton experienced delays in the approval of its shop drawings due to assertedly untimely and inadequate responses to its submittals by AOC. C4 Supp. 13 0260. For example, Lorton originally submitted the limestone shop drawings for approval on April 6, 1999, and the submissions were held in review by AOC for a total of 8 months. *Id.* Additionally, it took AOC more than 15 months to approve limestone samples for the South Addition, and more than 5 months to approve slate samples. C4 Supp. 13 0260-0261. As a result of the delays to the project, Lorton states that its performance was extended by 60 weeks, and ended on September 4, 2001. C4 Supp. 13 0259.

Because of the 60-week delay, Lorton initially submitted an extended home office overhead claim in the amount of \$123,934 using a "standard percentage of direct costs" method. C4 Supp. 08 00300, 302. Lorton subsequently revised its home office overhead claim to \$108,306, which it computed using the *Eichleay* formula.<sup>561</sup> C4 Supp. 13 0262; App. Exh. 105. While several Lorton witnesses testified at the hearing, none provided testimony regarding this claim. The only testimony in support of this claim was that of Mr. Dylus of Clark, who did not discuss how the subcontractor was impacted by the delays during the submittal process or explain this claim. H.Tr., Dylus, 22:167-68.

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<sup>560</sup> It appears that the amount of this claim is in error because shortly before the hearing, Lorton provided documentation that supported a delay damage claim in the amount of \$108,306 rather than \$123,934. C4 Supp. 13 0262.

<sup>561</sup> The *Eichleay* formula refers to the method first adopted by the Armed Services Board of Contract Appeals in *Eichleay Corp.*, ASBCA No. 5183, 60-2 BCA ¶ 2688, for estimating proportionate home office overhead that may be unabsorbed due to suspension or delay, and can be summarized as follows:

1. Total contract billings / total billings for contract period x total overhead for contract period = overhead allocable to the contract.
2. Allocable overhead / total days of performance = daily contract overhead rate.
3. Daily contract overhead rate x number of days delay = amount claimed.

We find that Lorton's extended home office overhead delay claim is unallowable. As noted, the No Damages for Delay clause limits the types of delay damages that are recoverable and specifically precludes the recovery of "all indirect and/or impact costs which shall include, without limitation: unabsorbed Home Office Overhead (including calculations under the 'Eichleay Formula')." R4, K0040. Neither Lorton's claim nor the testimony offered on its behalf explain how this amount is allowable under the contract, given the No Damages for Delay clause.<sup>562</sup> Therefore, we find Lorton cannot recover its claimed delay costs.

### B. Acceleration Claim

Lorton also claims \$17,814 in acceleration damages. App. Exh. 105. The claimed amount was for overtime or premium costs incurred from March 30 through September 1, 2001 after the project had been accelerated by Clark in response to AOC's constructive acceleration order by virtue of the February 5, 2001 cure notice. We find that Lorton was forced to incur premium costs in order to accelerate its performance in response to the constructive acceleration order. In this regard, the record shows that in certain areas of the project Lorton's activity durations were compressed in order to meet deadlines, while in other areas its durations were drawn out as a result of working on top of other trades. C4 Supp 08 00300. Project areas were also not made available to Lorton in an orderly manner, and the contractor was instead forced to "hop-scotch" around the job site and worked in spaces as they became available. *Id.*; H.Tr., Dylus, 22:168. The net effort to Lorton was a lost of productivity, and in order to make up for the lost production it was directed to work overtime. C4 Supp 08 00300. Lorton has reasonably supported its acceleration claim with daily time sheets and summaries showing the types and amounts of labor, and resulting costs.

Thus, we find that Lorton has shown allowable acceleration damages of \$17,814. However, as discussed above, this acceleration flowed from concurrently caused delays, so that Lorton may

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<sup>562</sup> We also note that even if the No Damages for Delay clause had not precluded recovery here, Lorton still failed to prove its entitlement to recover extended home office overhead based on the *Eichleay* formula. If the government suspends or delays work on a contract for an indefinite period, the *Eichleay* formula is commonly used to calculate the amount of unabsorbed or extended home office overhead the contractor can recover. *See e.g., P.J. Dick, Inc. v. Principi*, 324 F.3d 1364, 1370 (Fed. Cir. 2003); *Melka Marine, Inc. v. United States*, 187 F.3d 1370, 1375 (Fed. Cir. 1999). To be entitled to *Eichleay* damages, however, a contractor must first show that there was a government-caused delay to its planned contract performance "that was not concurrent with a delay caused by the contractor or some other reason," *P.J. Dick, Inc.*, 324 F.3d at 1370; *Sauer, Inc. v. Danzig*, 224 F.3d at 1347-48, and that the contractor's original contract performance time was thus extended. *Interstate General Government Contractors v. West*, 12 F.3d 1053, 1058-59 (Fed Cir. 1993). Second, the contractor must show that it was required to remain on "standby" during the delay. *P.J. Dick, Inc. v. Principi*, 324 F.3d at 1370. Where a contractor proves these elements, "it has made a prima facie case of entitlement" and the burden of proof shifts to the government "to show that it was not impractical for the contractor to take on replacement work and thereby mitigate its damages." *Id.*; *Melka Marine v. United States*, 187 F.3d at 1376. Here, Lorton has failed to demonstrate, or even allege, that it was required to remain on "stand by" during the delay period, and we find no evidence in the record that the contractor's workforce was on standby and could not be used for other projects.

only recover the acceleration damages attributable to the excusable portion of the total contract delay. Thus, we find that Lorton is entitled to 122.4/421 of its claimed \$17,814, that is, \$5,179.

### C. Interior Garden Court Flagstone, Clark Change Order No. 810387

Lorton requests an equitable adjustment of \$79,750 for its reduced productivity in satisfying the contract requirement to lay flagstone, with a one-eighth-inch joint, in the interior of the Garden Court. Specifically, Lorton argues that it was required to use salvaged flagstone in the Garden Court, and that this stone was not suitable for providing a uniform one-eighth-inch joint without significant cutting. Because Lorton had to do significant fieldwork--cutting--to lay the salvaged flagstone with the required joint width, Lorton requests the additional costs it incurred. App. PFF ¶¶ 532-35, 544.

AOC responds that Lorton visited the project site prior to submitting its subcontract bid to Clark for this work and had an opportunity to view the salvaged flagstone, and that Lorton is responsible for any faulty assumptions it made regarding the amount of effort that would be required to lay the interior Garden Court flagstone. Resp. PFF, part 6, tab III, at 1-3.

The contract provided that the interior Garden Court would be paved with flagstone. Section 02515, "Exhibit Paving and Curbs," of the contract provided that the contractor would perform this work using rectangular flagstone "salvaged from Architect's stockpiles" and "new rectangular flagstone, if existing material cannot be salvaged."<sup>563</sup> R4, K0250. With respect to the installation of the flagstone, the specification required that the contractor:

Cut paving and curbing units with motor-driven saw equipment designed to cut masonry with clean, sharp, and un-chipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.

R4, K0258. The specification also required:

After installing a completed regular or random stone paving surface insure a uniform joint width of 1/8". Where necessary, run a masonry saw along the joint to insure a consistent joint width.

R4, K0260. The specification also required the contractor to build a mockup of the stone flooring, showing the arrangement of stones. R4, K0251-52.

Eduardo Seara, an owner of Lorton, prepared Lorton's bid to Clark for this work. He testified that, prior to preparing Lorton's bid, he visited the site and saw the flagstone stacked on pallets. Mr. Seara assumed that the salvaged flagstone could be paved with a one-eighth-inch joint with minimal cutting, he testified "there's no way we can tell if it can be set to 1/8 unless we do a mock-up." H.Tr., Seara, 1:177, 219. He also testified "that we were going to set stone the [AOC] was going to provide for us. So basically it was resetting" and that "[t]ypically, our

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<sup>563</sup> The contract contained no specific clause that addressed government furnished property.

experience has been, when we remove the stone, we reinstall it back in the same condition it was." *Id.* at 1:176, 218.

Lorton provided its mockup of the interior Garden Court flagstone to AOC on September 18, 2000, and the mockup was "approved, as noted, subject to Contract Requirements," by AOC on September 22, 2000; in so doing, AOC specifically noted that Lorton was required to adhere to the one-eighth-inch joint requirement. R4, COF 2604-5.

In response to AOC's direction to adhere to the specification requirement, Lorton wrote on October 27, 2000 that it

agree[d] that this is the specified requirement, however, we feel that this is an unrealistic expectation based on the type of material used and its fabrication process. Attached is a letter from our supplier, Tompkins Bluestone Company, stating the tolerances for the flagstone paving. Their recommended joint width is a minimum of 3/8".<sup>564</sup> Based on this recommendation and their explanation, please confirm that a 3/8" to 5/8" joint will be acceptable.

R4, COF 2600. Lorton was directed by Clark to comply with the one-eighth-inch joint requirement and wrote Clark on June 23, 2001 that

This constitutes a change to our [sub]contract and that additional costs will be submitted for this work.

Please refer to specification section 02515.

Paragraph 2.2.A instructs us to use salvaged flagstone from AOC's yard. This material has irregular edges that make it impossible for joints to be maintained at 1/8".

R4, COF 2599.

Lorton paved the Garden Court interior with both new and salvaged flagstone using a one-eighth-inch joint, as directed.<sup>565</sup> H.Tr., Seara, 1:179. Lorton claims that because the salvaged flagstone was not cut straight enough or with appropriate angles, Lorton had to cut nearly every stone to satisfy the joint width requirement. *Id.* at 1:178. Mr. Seara testified that typically Lorton would have one mason with a single helper laying stone (a single crew), but here Lorton needed two masons and two helpers (two crews) to cut the stone and lay it. *Id.* at 1:181.

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<sup>564</sup> The letter from Lorton's flagstone supplier recommended a range in joint width of three-eighths-inch to five-eighths-inch. See R4, COF 2601.

<sup>565</sup> AOC's landscape architecture expert, Geoffrey Anderson, testified that he believed that Lorton did not use salvaged flagstone to pave the Garden Court interior, but used new flagstone obtained by from its supplier. H.Tr., Anderson, 1:232, 241. Mr. Seara testified, however, that Lorton used both new and salvaged flagstone to pave the Garden Court interior. H.Tr., Seara, 1:201, 205.

There is no dispute that the contract unambiguously required that the interior Garden Court flagstone be laid with a one-eighth-inch joint.<sup>566</sup> Rather, the linchpin of Lorton's argument that it is entitled to an equitable adjustment for its reduced productivity is that Lorton acted reasonably in assuming that the salvaged flagstone provided from AOC's stores could be laid, with minimal or no cutting, to satisfy the one-eighth-inch requirement. In support of this argument, Lorton cites a portion of paragraph 3.3.C of specification 02515, which states "[u]se full units without cutting wherever possible," R4, K0258, which assertedly informed Lorton that the salvaged flagstone to be provided by AOC could be laid with minimal or no cutting to achieve the contract requirements.

We find that section 02515 did not indicate that the interior Garden Court flagstone could be installed with minimal or no cutting. While it is true that paragraph 3.3.C of the specification stated that the contractor should use full units without cutting "wherever possible," that paragraph also states that the contractor was to "[c]ut paving and curbing units with motor-driven saw equipment designed to cut masonry with clean, sharp, and un-chipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly." *Id.* Thus, clearly this specification provision recognizes that the contractor may be required to cut the flagstone in order to pave the interior Garden Court in accordance with the contract requirements. There is nothing within this specification language that indicates the amount of cutting that will ultimately be necessary. Rather, the amount of cutting that would be necessary to satisfy the contract requirements was left to the contractor's business and technical judgment.

Lorton argues, however, that it could assume that the salvaged flagstone provided by AOC would be suitable for its intended purpose. App. PFF ¶ 533. The record indicates, however, that the salvaged flagstone was in fact suitable for its intended purpose; that is, the salvaged flagstone could be laid, with some cutting, with a one-eighth-inch joint.<sup>567</sup> Moreover, section 02515 also informed the contractor that it could use new flagstone to the extent that the salvaged flagstone could not be used, and, consistent with the specification, Lorton paved the interior Garden Court with both new and salvaged flagstone. *See* H.Tr., Seara, 1:201, 205.

Given that the pertinent specification did not indicate the extent of cutting that would be necessary to satisfy the contract requirement, Lorton must show some other words or actions by AOC that would lead Lorton to reasonably assume that the flagstone would not require more than minimal cutting to satisfy the contract requirements. Lorton has failed to do so here. Rather, Lorton argues that Mr. Seara's experience reasonably led him to assume that the

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<sup>566</sup> As Appellant recognizes, the fact that the one-eighth-inch joint requirement may be more stringent than industry standard does not absolve Clark and Lorton from its contractual obligation to satisfy the contract requirement of laying the interior Garden Court flagstone with a one-eighth-inch joint width. *See R.B. Wright Constr. Co. v. United States*, 919 F.2d at 1572 ("Neither a contractor's belief nor contrary customary practice, however, can make an unambiguous contract provision ambiguous, or justify a departure from its terms."); *John R. Hundley, Inc., supra* at 137,026 ("Trade practice cannot override an unambiguous contract provision.").

<sup>567</sup> As AOC notes, the one-eighth-inch joint requirement was not an impossible requirement, given that Lorton satisfied it. Resp. PFF, part 6, tab III, at 1.

salvaged flagstone could be set with minimal cutting to satisfy the one-eighth-inch joint width requirement. Mr. Seara's testimony in this regard, however, was that his experience in the industry was that "when we remove the stone, we reinstall it back in the same condition it was." H.Tr., Seara, 1:218. Although this testimony indicates Lorton's belief that the interior Garden Court flagstone originally was laid with a one-eighth-inch joint width, the record, including the contract, does not support the validity of this assumption; that is, Lorton has not presented any evidence as to how the interior Garden Court was originally paved or whether the interior Garden Court flagstone historically was laid with a one-eighth-inch joint. Moreover, Lorton did not remove the the salvaged stone, but this stone had been removed before Lorton was subcontracted to reinstall it, and the contract did not indicate that this stone was to be reinstalled "back in the same condition it was."

The Board also finds that, to the extent that Lorton assumed that minimal or no cutting of the stone would be required, the record does not support the reasonableness of this assumption. As is indicated above, Mr. Seara visited the site and viewed the salvaged flagstone prior to preparing Lorton's subcontract bid to Clark. Lorton has not explained why Mr. Seara could not have determined from this review of the palletized stone the extent of cutting that would be required. In this regard, Mr. Seara testified that the flagstone had to be cut to satisfy the one-eighth-inch joint requirement because the salvaged flagstone was not cut straight enough or with appropriate angles. *Id.* at 1:178. The straightness or angles of the edges of the flagstone are physical attributes that could have been, and here should have been, determined by an experienced contractor from a reasonable site visit. There is also no explanation as to why Mr. Seara did not seek to remove some of the flagstone from the pallets, if that was necessary to determine the amount of cutting that would be required. Although it is true that Mr. Seara testified that Lorton could not tell that the extent of cutting required until it prepared the mockup of the interior Garden Court flagstone, Mr. Seara offers no explanation as to why this was the case, nor does this testimony appear reasonable, given Mr. Seara's other testimony of his extensive experience in this industry.

In sum, the Board finds that whether or not the salvaged flagstone had to be cut to satisfy the unambiguous one-eighth-inch joint requirement was left to the contractor's business judgment, and that Lorton's claim that it was required to do more cutting than it originally estimated was not a change to Clark's contract. Accordingly, we deny this change claim.

#### **D. Monumental Door Closures/Threshold, Clark Change Order No. 810196**

##### **1. Background**

Clark has submitted claims on behalf of Lorton and Clark Concrete for asserted changes in the door closures and thresholds for the 15 monumental doors. Lorton's claim totals \$29,925 and Clark Concrete's claim totals \$5,964. R4, 8285. In response, AOC's states that the change should result in a credit to AOC because Clark employed a less expensive approach than required by the contract. *See* H.Tr., Coffey, 11:166-73; R4, COF 3710-11.

The Botanic Garden conservatory is ringed by 15 monumental doors, which were installed by Ridgeview. Lorton installed the granite thresholds for these doors. Both parties have described

this dispute, which arose from determining how to install the "Rixson" recessed floor-mounted door closures for the monumental doors, as a "tortured story." H.Tr., 11:5, 9; Sullivan, 11:18, 20-21; R4, K0740.

One of the drawings on which Lorton relied in preparing its shop drawings for the granite thresholds was detail R-13 on Drawing A605. H. Tr., Sullivan, 11:23. This drawing showed a single, monolithic piece of granite for each monumental door with a bump, that is, a one-half-inch rise, in the granite extending the width of the door sill. R4, Drawing A605; H.Tr., Sullivan, 11:14-15, 28.

The record shows that Lorton made its first submission of the granite shop drawings on January 11, 1999, which was rejected by AOC on February 22. R4, COF 3565, 3626. Lorton's next granite submittal was on July 28, 1999, and it was returned on August 23 by AOC to revise and resubmit. *Id.* Lorton's third submittal was on February 9, 2000 and it was held to await Clark's submittal of door profiles for the monumental doors. *Id.* In one of Lorton's submittals, a three-piece granite threshold was reflected instead of the monolithic threshold indicated by the contract drawings. H.Tr., Coffey, 11:177-78; R4, 7918. The record does not indicate that AOC objected to this difference. *See* R4, COF 3565. On April 11, 2000, Lorton asked for the location of the bump in the granite thresholds for the monumental doors, which question Clark forwarded that same date to AOC as RFI No. 424. R4, 7829-30.

In response, on April 21, AOC responded with three sketches (RD 61, RD 61A, RD 61B) further detailing the location of the bump on the granite thresholds, as well as the location of the "closer cases" for the Rixson door closers recessed below the threshold sill and the bump, and advised Clark, "Contractor to coordinate with stone installer for installation of floor closers and maintain proper weather seal." R4, 7906-09. The record evidences that this was first time that Lorton was advised that it had to account for the Rixson door closers in its granite threshold shop drawings. H.Tr., Sullivan, 11:23; Sennewald, 11:134.

While Clark blames Lorton's lack of knowledge about the need for the Rixson door closers on unclear and defective drawings because Drawing A605 did not show the closers, other contract drawings clearly showed the closers and their location recessed below the granite threshold sill.<sup>568</sup> R4, Drawing A5051, detail 17; Drawing A5053, detail R-5. We regard Lorton's lack of

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<sup>568</sup> Mr. Sullivan also suggested that the contract was ambiguous regarding the threshold requirements because the original contract specifications required a metal "threshold," model number NGP 896, for the monumental doors. H.Tr., Sullivan, 11:21; R4, K0740. We think that Mr. Sullivan must be mistaken. Not only does our review of the Internet website of National Guard Products, Inc. (the manufacturer of this threshold) indicates that NGP 896 was a "bumper seal" threshold made of vinyl (not metal), which "provides a seal against the door and increases the weather resistance of the threshold," <http://www.ngpinc.com/products>, National Guard Products Thresholds, at 11 of 40, but the record indicates that Clark made no such assertion during contract administration as would be expected if this was indeed the case. Mr. Sullivan may have been confused by the Clark's assertion made during contract administration that Change Order No. 36 (issued August 23, 1999) required a metal threshold for the monumental doors. However, Clark did not reference (nor have we found) which section of that change order imposed any such requirement and AOC contemporaneously made it clear, when asked, that a granite threshold was required. R4, 8250, 8266, 8267.

knowledge of this detail, more than 15 months after it made its first granite drawing submittal, as evidence of Clark's failure to coordinate the work of its subcontractors as required by the contract. See R4, K0079, where the contract requires Clark to "[c]ontinuously coordinate the work of subcontractors included in various Sections of these Specifications to insure proper processing and progress of the work." Contrary to Clark's apparent belief, AOC does not have privity with each of Clark's subcontractors, but its contract was with Clark, which was required to coordinate all trades and assure that each trade is aware of relevant information normally appearing on drawings applicable to other trades. See *David Boland, Inc., supra*, at 155,171.

The issue of how the Rixson closers would be installed at the monumental doors was a primary subject of a May 3, 2000 meeting attended by representatives of Clark, DMJM, Ridgeview and Judd.<sup>569</sup> R4, 7836-37. Ridgeview noted that the RD 61 sketches, which required a continuous granite threshold at the monumental doors, did not allow for the replacement of the Rixson closers. R4, 7836. Ridgeview also noted that the maximum spindle length on the Rixson closer was 2 inches and that the load bearing limitations on the threshold sill where the closer was to be installed had to be considered. *Id.* The spindle length is an important consideration in determining how the closer is installed because it must extend from the recessed closer to five-eighths-inch into the monumental door in order for the closer to operate. H.Tr., Sullivan, 11:54-55.

At the May 3 meeting, two options as to how to install the closers were discussed by the parties present at the meeting. R4, 7837. The first option was to change to metal thresholds and the second option was to make a "mini-trench for the closer [with] granite cover plates, over a terrazzo pan, attached [with] screws . . . for access to closer." R4, 7837. Sketches were made at the meeting to illustrate each option. R4, 7838-39.

Shortly after the meeting, Lorton asked several questions, including whether the maximum spindle length of 2 inches would work with a terrazzo pan under the second option. R4, 8292. Also, according to Mr. Coffey of DMJM, some time after the meeting, Clark and its subcontractors agreed that it was feasible to install the monumental door thresholds in accordance with the second option sketch involving the use of the terrazzo pan and agreed to proceed with this option. H.Tr., Coffey, 11:196-98; R4, COF 3626-27.

The record indicates that nothing of significance happened until July 18 when Clark advised AOC that it had received no further information from DMJM regarding this issue, and that, while it may be that the second option was feasible, it needed a detailed design by DMJM of this option. R4, 7848. This led to an immediate (July 18) response from AOC advising Clark of its understanding that Clark had agreed to proceed with the second option and stating that AOC was aware of no "lingering questions." R4, 7855. Clark responded on July 27 that there was no such agreement and it had been repeatedly requesting "viable" details since the May 3 meeting. R4, 7862-63. We need not decide whether there was an agreement, but again observe that the record evidences that this was typical of the way communications between the parties went during this project.

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<sup>569</sup> There was no Lorton representative at this or most of the other meetings concerning the monumental doors.

Meanwhile, on July 19, Lorton asked more questions regarding the second option, including whether the "threshold 'bump' over the cover plate [was] a separate piece of stone from that inside the cover plate?" which questions were incorporated into RFI No. 520 addressed to AOC. R4, 7858, 7859. AOC responded to these questions on July 25, noting among other things that some of the questions could be answered by coordinating this work with the subcontractors and manufacturer, and that "the bump portion of the stone is one integral piece of stone with stone inset piece." R4, 7856. Another meeting occurred on July 28, about which Mr. Sullivan (who did not attend) testified that nothing was resolved and about which AOC indicated that it was mostly a coordination meeting for Clark and its subcontractors regarding how the work could be accomplished. R4, 7865-66, COF 3565; H.Tr., Sullivan, 11:61.

Beginning on September 12, Clark repeatedly stated to AOC that, notwithstanding AOC's position that granite thresholds were required, Clark was going to install metal thresholds at the monumental doors because of schedule considerations, in particular the fact that the fabrication and delivery of the granite thresholds would take a minimum of 16 weeks, and that work on this portion of the project was to be completed by December 31. R4, COF 3565, 3605, 3632. AOC immediately and repeatedly responded that this was not acceptable and that granite thresholds were required. R4, COF 3565-66, 3592, 3599. Clark finally substantively responded to AOC's repeated negative responses to Clark's unilateral determination to use metal thresholds with a supported attempt to persuade AOC that metal thresholds would satisfy AOC's aesthetic requirements, but AOC still insisted on the granite thresholds. R4, 3593-98. No agreement was reached by the parties and this issue apparently went on the "back burner."

This issue resurfaced in AOC's February 5, 2001 cure notice raising the possibility that Clark's contract could be terminated for default, which stated with regard to this issue that "Clark is installing exterior monumental door thresholds that do not comply with the contract specifications, and has refused to correct them, despite notice from AOC that the thresholds will not be accepted." App. Exh. 52.

This apparently led to renewed discussions between the parties, which culminated in a Clark design transmitted to AOC on May 2, 2001, where Clark proposed to provide and install custom fabricated aluminum cover plates for the Rixson closers shaped to match up with the bump at the threshold sill, and the rest of the threshold sill would be covered by 2-inch thick granite (instead of the 9½-inch granite contemplated in the AOC design for the entire threshold) on top of cement (which was also installed below the Rixson closer cases); the rest of the threshold area would be covered by the 9½-inch granite as contemplated by the AOC design. R4, COF 3567; App. Exh. 48; H.Tr., Sullivan, 11:67-68, 70-75, 100-01, 105, 113-14; Sennewald, 11:124-25, 133. Thus, under this design, instead of installing three pieces of 10 foot long, 9½-inch granite at each threshold, Lorton installed three pieces of 10 foot long, 9½-inch granite, which were 8 inches narrower than originally contemplated, to account for the new sill design, and two pieces of 2-inch granite to be installed on top of the installed cement in the threshold sills. App. Exh. 48; H.Tr., Sennewald, 11:133, 138-44.

In response to this proposed approach, on May 17, AOC stated:

The submittal package is not per the contract documents and is being accepted by AOC for expedience sake. The appropriate contract change order information will follow by separate cover.

R4, 7894. On that same date, AOC recognized that Clark's proposed approach represented a change to the contract. R4, COF 3575.

## 2. Defective Design

Mr. Sullivan testified in depth and without rebuttal as to why the original DMJM design and the second option would not allow for the proper installation of the Rixson closer at the monumental doors' granite threshold sills. He testified that the primary reasons this could not be accomplished were the differences in width between the Rixson closer and the bump on the threshold sill and a greater spindle length than the maximum 2-inch spindle length available from the manufacturer would be required to install Rixson closer in accordance with either the contract drawings or the second option. H.Tr., Sullivan, 11:53-59, 68-70, 76-87, 202-03; App. Exhs. 47, 49. While Mr. Coffey testified that Mr. Brainerd of DMJM had been advised by Rixson that a 3-inch spindle was available, H.Tr., Coffey, 11:193-94; *see also* R4, COF 3626-27 (memorandum to file where Mr. Coffey stated, "Ridgeview stated that if we wanted a longer spindle he could get one"), Mr. Sullivan responded that he personally talked at length with two Rixson engineers who advised him that the maximum spindle length for the model of Rixson closure specified was 2 inches.<sup>570</sup> H.Tr., Sullivan, 11:204. Mr. Sullivan explained:

If you would extend this spindle let's say, to three inches, let's say you welded something on there and extended it, then you're changing the whole engineering properties of how this thing goes back into itself and works with those springs [making up the Rixson closure]. You can't go more than two inches.

H.Tr., Sullivan, 11:58. Under the circumstances, we credit Mr. Sullivan's testimony that the Rixson door closers could not be installed as indicated in the contract documents or the second option, and find that this constituted a change under the contract caused by a defective specification.

## 3. Lorton's Claim

Lorton's claim totals \$29,925 and contains the following elements:

2-inch Granite	\$6,588
5 Diamond Blades (\$102 each)	\$510

<sup>570</sup> Our review of Rixson's Internet website indicates that the maximum spindle length offered for the Rixson PH H27 model specified in the contract for the monumental doors is 2 inches. R4, K0740; <http://www.rixson.com/library/catalogs, Heavy Duty Floor Closers, at 10>.

Mason Foreman (240 hours x \$45.08 per hour)	\$10,819
Mason Helper (240 hours x \$28.39 per hour)	\$6,814
<b>Subtotal</b>	<b>\$24,731</b>
Overhead and Profit	\$5,194
<b>Total</b>	<b>\$29,925</b>

R4, 8287. The granite costs are for granite previously delivered for the National Garden project, which was taken from that project and instead used for the monumental door threshold sills. H.Tr., Sennewald, 11:126-27, 136. The rest of the change claim represented Lorton's estimated labor and diamond blade costs in cutting the 2-inch granite to fit and installing this granite at the monumental doors' threshold sills. *Id.* at 11:128.

AOC has taken the position that a credit is due because the actually built threshold is of less value than what was originally specified, and that Clark has failed to take into account its estimated costs to perform the work at the thresholds as called for in the contract in its request for equitable adjustment. Resp. PFF, part 3, tab IV; *see* H.Tr., Coffey, 11:161-74.<sup>571</sup> However, where, as here, a change is caused by a defective specification the government is liable for the additional costs caused the contractor by those defective specifications. *Hol-Gar Mfg. Corp. v. United States*, 175 Ct.Cl. at 524. Under such circumstances, the contractor need not establish the amount that it originally estimated for the work to obtain an equitable adjustment based on its demonstrated damages caused by the defective specifications.

AOC also argues that Lorton's claim does not take into account that Lorton provided three pieces of 9½-inch granite, instead of a single, monolithic piece, for each threshold. However, Mr. Sullivan testified, without rebuttal, that Lorton obtained no advantage to this approach and that installing three separate pieces may be even more labor intensive than installing the single piece. H.Tr., Sullivan, 11:77-78. We see no reason not to credit Mr. Sullivan's testimony and find no basis to find that Lorton's claim had to account for this substitution.

AOC next argues that Lorton's claim did not account for the fact that 75 cubic feet less granite was provided than contemplated by the contract and that a credit should have been provided by New England Stone, LLC, the supplier of the granite. H.Tr., 11:161. However, as noted above, this granite had to be ordered at least 16 weeks in advance and this change that narrowed the 9½-inch granite by 8 inches was made after the order had been made. R4, COF 3632. Mr. Sennewald of Lorton testified that its supplier did not give it a credit because the granite slabs are cut from a block and the granite left over is considered waste. H.Tr., Sennewald, 11:155-56. The record also reflects that Lorton apparently attempted to obtain a credit and the supplier explained why it would not give one. R4, COF 3709.

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<sup>571</sup> Mr. Coffey prepared an estimate that indicated that this change should have resulted in a \$64,727 credit to AOC based on the difference between what he estimated the work as initially specified and how the work was actually performed. R4, COF 3710-11. However, as pointed out by Clark, this estimate was fatally flawed for a variety of reasons; for example, it credited Clark's base price for the cost of installing the entire threshold, but only considered Clark's change proposal as submitted, even though it only contained costs for the installation of the 2-inch granite at the threshold sill and did not include any costs associated with the installation of the rest of the threshold. H.Tr., Coffey, 11:176-77

While we agree that ordinarily a credit for providing less granite would be expected in determining an equitable adjustment as a result of this change calling for less granite than the contract contemplated, we credit Mr. Sennewald's testimony that he was unable to obtain a credit here, given that this granite was a long lead item that had to be ordered before this change was made in order to allow for timely contract completion. In this regard, because of the parties' mutual intractability, this change was not made until May 2001 (well after the September 5, 2000 completion date established by the contract), during a period when the work was being accelerated to allow contract completion by August 31, 2000. Under the circumstances, we find that AOC is not entitled a credit because less granite was provided than the contract required.

With regard to the granite obtained from the National Garden project, Mr. Sennewald testified that AOC had already paid for this granite, but that Lorton would replenish the granite if this aspect of the claim were allowed. H.Tr., Sennewald, 11:130-31. Because AOC already paid for this granite and Lorton incurred no additional granite costs here, this claimed cost is not recoverable.

Lorton's claim for its estimated labor and diamond blade costs is based upon an estimate prepared before the work was done. *Id.* at 11:158-59. Mr. Sennewald testified that typically Lorton tries to separate out changed work from the other work, but it does not always happen and that it is possible to track the hours separately, but in this case he "would have to see the actual tickets" tracking these costs to see if it was done. *Id.* at 11:160-61. Mr. Sennewald did not testify whether or not he did in fact determine whether the actual labor costs were tracked here.

AOC states that we should not allow Lorton's claim as it is based upon estimated costs. As indicated above, estimates of a contractor's costs may be used where actual cost data is not available. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321.

Here, Mr. Sennewald indicated that actual cost data may have been available but he did not check to see if this was the case.<sup>572</sup> Thus, we find no basis to find Lorton's estimated labor costs recoverable based upon the estimates prepared before the work was done. The record, however, contains evidence that Lorton did in fact track its actual costs for this change; that is, there is a signed document dated July 24, 2001 (after this work had been completed) on Lorton letterhead specifically referencing this change and stamped "Verified Time & Material Only." R4, 7903. This document indicates that 74 mason hours and 74 mason helper labor hours were incurred on this change, and that 15 diamond blades were consumed. *Id.* Based on this document, we find that Lorton is entitled to recover \$8,430 for this change claim calculated as follows:

15 Diamond Blades (\$102 each)	\$1,530
Mason Foreman (74 hours x \$45.08 per hour)	\$3,336
Mason Helper (74 hours x \$28.39 per hour)	\$2,101
<b>Subtotal</b>	<b>\$6,967</b>

<sup>572</sup> In its reply brief, Clark attempts to "spin" Mr. Sennewald's testimony by asserting that these costs could not be tracked. App. Reply Brief at 99-100. We do not find Clark's unsupported interpretation of Mr. Sennewald's testimony to be persuasive.

Overhead (10%)	\$697
Profit (10%)	\$766
<b>Total</b>	<b>\$8,430</b>

#### 4. Clark Concrete's Claim

Clark Concrete's claim of \$5,964 was detailed as follows:

Concrete	\$108
Plastic (protection)	\$50
Plywood (protection)	\$152
Fabricated Rixson cover plates	\$1,500
Finisher	\$478
Laborers	\$2,901
<b>Subtotal</b>	<b>\$5,189</b>
Overhead and Profit	\$775
<b>Total</b>	<b>\$5,964</b>

R4, 8286. This claim was also based upon an estimate prepared before this work was done. The Rixson cover plates were those custom fabricated to cover the Rixson closers, and the claimed costs for the concrete and labor were for the concrete poured below the 2-inch granite and the Rixson closers installed at the 15 monumental door threshold sills. H.Tr., Sullivan, 11:92-93.

AOC asserts that Clark Concrete's claim should be denied because no support has been provided showing that it a reasonable estimate of the changed work. As noted above, estimates of a contractor's costs may be used where actual cost data is not available, but such estimates should be prepared by competent individuals with adequate knowledge of the facts and circumstances, and the testimony of individuals familiar with the facts is helpful in verifying the validity of estimates. *Delco Elecs. Corp. v. United States*, 17 Cl. Ct. at 321.

Here, the only support provided by Appellant for Clark Concrete's claimed costs was Mr. Sullivan's testimony, where he simply read the claimed costs from the claim, responded "yes" to the question "Clark Concrete strives to do this [referring to preparing its estimates] fairly and reasonably?" and stated that he knew the work was performed because "I was directing the people at that time." H.Tr., Sullivan, 11:91-93. Importantly, Mr. Sullivan's testimony did not extend to whether the Clark Concrete estimate was in fact prepared by a competent individual with adequate knowledge of the facts and circumstances or why the costs were considered fair and reasonable.<sup>573</sup> This is insufficient to show the reasonableness of the estimate so as to allow these claimed costs to be recovered.<sup>574</sup> We therefore find that Clark Concrete is not entitled to recover its claimed costs for this change.

<sup>573</sup> No Clark Concrete witness testified at the hearing.

<sup>574</sup> As noted above, DCAA found that Clark Concrete has the ability to track its actual costs. DCAA Audit of Clark Concrete at 9. While it may be that Clark Concrete could not have tracked its costs for this particular change, no testimony was provided that evidenced that this was the case. Furthermore,

## **XX. RIDGEVIEW'S CLAIMS**

Ridgeview claims \$238,021 in delay damages and \$2,992 in acceleration damages. App. Exh. 106.

### **A. Delay Claims**

#### **1. Background**

On August 28, 1998, Clark subcontracted with Ridgeview, a glass and glazing company, for the fabrication and installation of specified portions of the renovation contract. C4 Supp. 13 0299; H.Tr., Dylus, 22:168-69. Ridgeview's scope of work included the fabrication and installation of the 22 monumental doors located around the outside of the Botanic Garden building, as well as the "Pilkington Planar System"<sup>575</sup> walls that separated the gift shops within the Orangerie. *Id.* at 22:169. The original amount of Ridgeview's subcontract with Clark was \$1,013,661. C4 Supp. 13 0310. This price consisted of Ridgeview's estimated material and labor costs of \$760,668, as well as a "+/- 33%" markup for the contractor's indirect expenses and/or profit.<sup>576</sup> C4 Supp. 13 0303, 0310. The largest element within Ridgeview's estimated costs was a quote furnished to it by Active Industries, Inc. (d/b/a Pittco Architectural Metals, Inc.) for furnishing the fabricated and assembled custom aluminum entrances at a price of \$526,424. C4 Supp. 13 0303, 0308-09. Under its original performance schedule, Ridgeview's on-site installation was to commence 18 weeks after submittal approvals, with substantial completion by 10 weeks after the start of installation. C4 Supp. 13 0299. Ridgeview originally anticipated completion of its work by December 1999. *Id.*

#### **2. Government Caused Delay Found**

Ridgeview claims that it experienced significant delays to its performance as a result of AOC delays in the submittal review process as well as incomplete and incorrect contract documents. C4 Supp. 13 0299. For example, Ridgeview's monumental door submittals were in review for approximately 12 weeks, the monumental door hardware submittals were in review for approximately 16 weeks, the Wausau windows submittals were in review for almost 11 weeks, and the Pilkington glass walls submittals were in review for approximately 22 weeks. *Id.*; App. Exh. 106 at 2. The delays in the submittal review process affected Ridgeview's ability to commence engineering, production, fabrication, and installation as originally planned. C4 Supp. 13 0299.

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Mr. Sullivan testified in response to the question, "Who fabricated the cover plates that were the custom-vented change for cover plate?" with "Clark did, my shop," H.Tr., Sullivan, 11:115, which indicates that these claimed costs may not have been incurred by Clark Concrete, as claimed, but may have been incurred by Clark itself. As indicated above, Clark did not always distinguish between its own and Clark Concrete's costs in its change claims. See H.Tr., Erdelsky, 8:120-24

<sup>575</sup> The Pilkington Planar System is a structural glazing system.

<sup>576</sup>  $\$760,668 \times 1.33 = \$1,011,688.$

Ridgeview provided no witnesses at the hearing to testify regarding its delay and acceleration claims,<sup>577</sup> and the testimony given by Clark's representatives on Ridgeview's behalf was limited to the following:

They were impacted by the fact that the project was delayed from their scope of work for more than 16 months. They had tried to get shop drawing approval on the monumental doors for close to six -- 12 to 16 months. When the monumental doors were eventually approved, their vendor pulled their number, because it was a stale proposal. They had a certain date by which they needed to have the proposal executed, so they had to reprocur the doors and there is a cost associated with that.

H.Tr., Dylus, 22:169. Ridgeview eventually completed its subcontract performance on August 31, 2001, a total of 21 months beyond its anticipated completion date of December 1999.

On the other hand, AOC provided no evidence suggesting that Ridgeview was not delayed for the reasons and period of time documented or that AOC's delays in approving submittals were not the cause for the delay. Instead, AOC argues that Ridgeview has failed to establish that it expended additional time and effort under the contract as a result of the delays, as opposed to the expending the planned amount of effort in a different time frame.

We find that Ridgeview was delayed by government-delays in approving submittals. While Ridgeview may not have expended additional time and efforts as a result of the incurred delays, we find that the contractor demonstrated that it did incur additional costs for performing its work in a later time period.

### 3. Ridgeview Claim

Ridgeview's delay claim is based on the subcontractor's assertion that the 21-month delay in its completion date--from December 1999 until August 31, 2001--resulted in an increase in the costs of performance. Ridgeview calculated its delay claim, based in part on the total cost method, as follows:

Bid Cost	\$760,668
Total Costs Incurred	\$943,033
<b>Cost Overrun Subtotal</b>	<b>\$182,365</b>
Less Acceleration	<\$2,992>
Less Change Orders	<\$46,171>
Less Labor Rate Increase	<\$6,112>
Less Reproduction	<\$856>

<sup>577</sup> We disagree with AOC that Ridgeview's failure to provide a knowledgeable witness should preclude its recovery of delay costs because it deprived AOC of the opportunity of cross-examining Ridgeview's witnesses concerning its claim. We note in this regard that AOC had the opportunity during discovery to depose Ridgeview representatives concerning its documentation concerning its delay claim and chose not to do so, and had the opportunity to provide witnesses or evidence of its own to rebut Ridgeview's claim.

<b>Cost Overrun Total</b>	<b>\$126,234</b>
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Active Costs	\$32,241
Reproduction	\$856
Labor Rate Increase	\$6,112
Project Management	\$31,268
Overhead (10%)	\$19,671
Profit (10%)	\$21,638
<b>Total</b>	<b>\$238,021</b>

C4 Supp. 08 00380-81; App. Exh. 106. Thus, Ridgeview's delay claim consists of five elements: (a) cost overrun; (b) Active delay costs; (c) reproduction costs; (d) labor rate increase costs, and (e) project management costs.

a. Cost Overrun Claim

With regard to the claimed \$126,234 in cost overruns, Ridgeview essentially contends that all costs it incurred in excess of the subcontractor's bid estimate (other than those for change orders and some of its separately asserted delay and acceleration claims (*i.e.*, acceleration, labor increases and reproduction)) were the result of the government's actions and inactions. However, Ridgeview has failed to meet its burden for using a total cost claim method. *See WRB Corp. v. United States*, 183 Ct. Cl. at 426. Assuming, *arguendo*, that the subcontractor's actual incurred costs are reasonable, Ridgeview presented no evidence in either its written submissions or in the testimony introduced at the hearing to establish that the contractor's bid was realistic, that the contractor was not itself responsible for any of its added costs, or that the nature of the particular cost was impossible or highly impracticable to determine with a reasonable degree of certainty. Thus, this portion of Ridgeview's delay claim is rejected.

b. Active Cost Claim

The second element of Ridgeview's delay claim is for additional costs it incurred from its vendor, Active, as a result of the delays to the fabrication and assembly of the monumental doors (\$32,241). By letter dated April 4, 2000, Active informed Ridgeview that:

The 'final' record and fabrication drawing will be sent to you this week, approximately '16 months' after receipt of your referenced purchase order. Due to this extremely lengthy delay, or original quote of July 13, 1998 is null and void and has been re-quoted to incorporate the increased cost from our outside purchases and our internal costs. The cost difference is an increase of 6% thus changing our original proposal from \$526,424.00 to \$558,009.00--an add of \$31,585.00.

C4 Supp. 13 0374. Active subsequently revised and supported a price increase of \$32,241. C4 Supp. 13 0383. Based on our review of the record, we find that this claimed cost was reasonable and attributable to government caused delay.

However, given that this Board has attributed most of the significant delays on the critical path of the contract to Clark, we need to consider whether those critical path delays are concurrent with the delay for which Ridgeview is claiming damages here, so as to preclude or limit that firm's recovery of delay damages. While we have no CPM testimony or analysis on this point, our review of the as-planned baseline schedule indicates that Ridgeview work activities, for example, installing the monumental doors, had considerable float time and did not appear to be directly impacted by the critical path work in the Palm House aluminum structure and glazing system. Clark's Baseline CPM Schedule. Given that Active raised its price because of the delay on April 4, 2000 (after the December 1999 date when it had planned to complete its work and well before the scheduled September 5, 2000 contract completion date), we have no reason to believe that the critical path delay was a concurrent cause for the delay that caused Ridgeview's damages here.

Thus, we find that Ridgeview is entitled to recover \$32,241 for the second element of its delay claim.

#### c. Reproduction Cost Claim

The third element of Ridgeview's delay claim is for reproduction costs of \$856. As part of its claim, Ridgeview submitted its job cost history report, setting forth each and every cost that the contractor booked to the renovation contract. C4 Supp. 13 0317-36. Notwithstanding this cost documentation, however, Ridgeview's claim fails to establish how the reproduction cost figure was derived or how the reproduction costs resulted from the compensable delay. Accordingly, we find no entitlement here.

#### d. Labor Rate Increase Claim

The fourth element is based on its assertion that the government-caused delay resulted in a labor cost increase of \$6,112. Ridgeview's employees were members of the Painters and Allied Trades District Council 51 union, and Ridgeview was subject to a negotiated collective bargaining agreement (CBA) that governed the terms and conditions of its workers' employment. C4 Supp. 13 0341. The CBA established the minimum wages and fringe benefits that employers were required to pay to the various tradesmen covered by the agreement, including glaziers. Additionally, the wages and fringe benefits set forth in the CBA increased incrementally over various periods of time.

The CBA wage rate and fringe benefit rates for the period of June 16, 1999 to January 15, 2000 were in effect at the time that Ridgeview originally planned to perform its installation work here. By contrast, by the time that Ridgeview performed its installation work for the renovation contract, higher wage and fringe benefit rates for glaziers were in effect. Specifically, for the work performed during the period of June 16, 2000 to June 15, 2001, glazier wages and fringes had increased by \$1.21 per hour from those in effect originally, and for the work performed during the period from June 16, 2001 to June 15, 2002, glazier wages and fringes had increased by \$2.10 per hour from those in effect originally. C4 Supp. 13 0302, 0341-0344. In its claim, Ridgeview calculated the number of labor hours affected by the higher wage rates as follows:

6/16/00 thru 6/15/01:	4,058.25 hours x \$1.21	\$4,910
6/15/01 thru completion:	572.25 hours x \$2.10	\$1,202
<b>Total</b>		<b>\$6,112</b>

C4 Supp. 08 00382. We find that Ridgeview has adequately documented the claimed amounts here and has demonstrated that these damages were attributable to government-caused delay.

However, because the claimed damages for this delay are for a period that extends to August 31, 2001, when the contract was considered substantially complete, it seems apparent that this element of Ridgeview's delay claim was necessarily affected by the concurrent critical path delay (discussed above). This is so because the critical path, by definition, represents the longest path through the project schedule. As noted above, it was Clark's burden to demonstrate that any claimed delay did not have concurrent causes. *William F. Klingensmith, Inc. v. United States*, 731 F.2d at 808; *Hoffman Constr. Co. of Oregon v. United States*, 40 Fed. Cl. at 198. Here, no evidence was produced that would suggest that these damages were not concurrently caused by the critical path delay.

In the absence of evidence to the contrary, we find that that portion of the increased wages up to September 5, 2000, the original completion date stated in the contract, was not affected by the critical path delay and that the amounts resulting from the increased wage rates incurred prior to that date are fully recoverable. On the other hand, the 360 days of delay from September 5 to the end of the contract had the concurrent cause of the critical path delay, and we find that Ridgeview is entitled to recover delay damages in the form of its increased wage rates for the proportion of the critical path delay that was AOC's responsibility.

Ridgeview has not further broken out its increased labor costs caused by the delay by day or month, so we presume for purposes of determining Ridgeview's recovery here that the labor costs were evenly spread over the delay period. To determine the delay damages incurred for the period prior to September 5, 2000 (for which there was no concurrent delay), we take the ratio of the number of days from June 16, 2000 to September 5, 2000 (81 days) to the 365 day period (from June 16, 2000 through June 15, 2001), on which the \$4,910 claim is based, to determine that Ridgeview's recoverable damages for this period are \$1,090. With regard to the rest of Ridgeview's increased wage rates delay damages that total \$5,022,<sup>578</sup> there was concurrent critical path delay. As indicated above, we can apportion the delay attributable to AOC causes, and find that Ridgeview is entitled to recover 120.4/421 of \$5,022, or \$1,436. Thus, Ridgeview is entitled to recover \$2,526 in delay damages for its increased labor costs.<sup>579</sup>

<sup>578</sup> \$4,910 - \$1,090 = \$3,820 + \$1,202 = \$5,022.

<sup>579</sup> \$1,090 + \$1,436 = \$2,526.

e. Project Management Cost Claim

The last element of Ridgeview's delay claim is for project management costs in the amount of \$31,268. In support thereof, Ridgeview asserts, "[d]ue to the delay in this project and the additional engineering required as outlined in this delay claim, [project manager] was required to manage this project for an additional twenty-one (21) months. These cost [sic] represent the additional overhead absorbed by Ridgeview during the course of this delay." C4 Supp.08 0383. Ridgeview determined the amount of its claim here by aggregating the wages and benefits of its project manager for the 21-month period in question, and applying a 20-percent prorated rate to that amount ( $\$156,338 \times 20\% = \$31,268$ ).<sup>580</sup> C4 Supp. 08 0383; C4 Supp. 13 0313-0316.

Under the contract's No Damages for Delay clause's definition of "damages," the contract expressly precludes the recovery of unabsorbed home office overhead, but permits the recovery of direct costs, including direct labor costs, "provided, however, that the accounting practice of treating these costs as "direct" shall be in accordance with (1) the Contractor's established and consistently followed cost accounting practices for all work, and (2) FAR Cost Accounting Cost Principles and Procedures (FAR Part 31)." R4, K0040. The purpose for demanding such consistency in allocating the costs incurred for the same purpose is quite clear: it is to require that each type of cost is allocated only once and on only one basis to any contract or other cost objective, and thereby guard against the overcharging and double counting that often accompanies a failure to treat like costs in a like manner. *See* Cost Accounting Standard 402, 48 C.F.R. § 9904.402 (2004); FAR § 31.201.

Ridgeview has failed to show that it has treated the project management costs claimed here in accordance with its established and consistently followed cost accounting practices. Specifically, Ridgeview has not presented any evidence demonstrating that it normally treats its project management expenses as a direct cost of contract performance. In fact, the record supports a finding to the contrary. Ridgeview's bid worksheet sets forth its estimated direct labor and material costs for Botanic Garden contract; the bid worksheet does not show that the contractor's project management expenses are a direct cost item. C4 Supp. 13 0303. Similarly, Ridgeview's "committed cash position report" also fails to indicate that the company's project management expenses were normally treated as a direct cost of contract performance. C4 Supp. 13 0310. Even Ridgeview's claim here, which treats project management expenses as a prorated, or partial, direct cost, supports the conclusion that such a practice is not how Ridgeview normally treats such expenses. As Ridgeview has failed to establish that its project management expenses are normally treated as a direct cost, we find this aspect of Ridgeview's delay claim is prohibited by the terms of the contract.

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<sup>580</sup> In support of its use of a 20-percent prorated rate, Ridgeview asserts that the project manager manages an average of \$5 million of project billings per year, C4 Supp. 08 0383, in comparison to the \$1 million Ridgeview subcontract for the Botanic Garden project.

#### 4. Conclusion

In sum, we find that Ridgeview is entitled to recover \$42,070, calculated as follows:

Active Costs	\$32,241
Labor Cost Increase	\$2,526
<b>Subtotal</b>	<b>\$34,767</b>
Overhead (10%)	\$3,478
Profit (10%)	\$3,825
<b>Total</b>	<b>\$42,070</b>

#### B. Acceleration Claim

Ridgeview claims \$2,992 in acceleration costs based on Clark's direction to remove and later reinstall the top door sections and transom bars of Monumental Doors M9 and M19, which Ridgeview had previously installed. C4 Supp. 08 0477-78, 0482. Ridgeview performed the work as Clark directed during the week of August 27, 2001. C4 Supp. 08 0481, 0484-88.

In its claim to AOC, Appellant states that while the original installation of these doors was part of the contract work, "[t]hese doors were removed and reinstalled in order to mitigate delays associated with the accelerated schedule." R4, 11993. Similarly, Ridgeview asserts that the "acceleration of the project required Ridgeview to perform work on overtime and perform work out of sequence which caused Ridgeview to incur additional costs."<sup>581</sup> C4 Supp. 08 0474. In its post-hearing brief, Clark argues that removing the top doors and transom bars was done to allow greater ingress for plants and exhibits. App. PFF ¶ 460.

We find that Appellant has failed to establish its entitlement here. Even assuming, as Clark argues, that Ridgeview removed and reinstalled the top doors and transom bars in order to facilitate the movement of the plants and exhibits into the conservatory, Clark has not explained why, in terms of trade coordination and means and methods, it did not originally plan to install the M9 and M19 door tops and transom bars after it moved the plants and exhibits into the building.<sup>582</sup> While Clark argues in its post-hearing brief that Ridgeview "prematurely installed" the monumental doors in order to secure the building, Clark's PFF ¶ 460, it has pointed to no evidence in the record that supports this argument. It may be that Clark had a valid reason for why it had Ridgeview install, remove, and then reinstall these monumental door sections. However, even though the contracting officer's decision on this claim found that "Clark provide[d] no supporting documentation that the work undertaken was the results [sic] of an accelerated schedule," Clark did not present any testimony or other evidence, much less demonstrate, that the actions here were the result of a constructive acceleration by AOC, as

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<sup>581</sup> Ridgeview adequately captured the actual labor and equipment costs incurred for this additional work. C4 Supp. 13 0286-0298.

<sup>582</sup> The record evidences that Ridgeview installed the monumental doors during June and July 2001. *See e.g.*, C4 Supp. 01 00144, 00160.

opposed to being simply a matter of Clark's means and methods and trade coordination. Ridgeview's acceleration claim is denied.

## XXI. TG CONSTRUCTION'S CLAIMS

TG Construction was the subcontractor responsible for the fabrication and delivery of various "exhibit artifacts," that is, simulated trees and rocks.<sup>583</sup> H.Tr., Dylus, 22:170. TG claims delay damages in the amount of \$40,667 and acceleration damages in the amount of \$36,149. App. Exhs. 108, 139, attach. 10.

### **A. Delay Claims**

TG's installation work as originally planned was to be accomplished during two separate mobilizations of 4 weeks each and be completed by September 2000. C4 Supp. 08 1113, 1290. The delays that Clark encountered regarding construction of the Palm House did not impact on TG's efforts to fabricate the exhibit artifacts, but did impact on TG's ability to deliver and install the exhibit artifacts as originally planned. H.Tr., Dylus, 22:170. Instead of delivering the exhibit artifacts to the job site upon fabrication, TG had to place the completed exhibit items in bonded storage facilities in both Arizona and Washington, D.C. *Id.*; App. Exh. 108. Moving the completed exhibit items into and out of the storage facilities also resulted in additional instances of material handling on the part of the subcontractor here. H.Tr., Dylus, 22:170. TG has provided evidence supporting its storage rental and mobilization costs, including the storage facility lease agreement. The delay in installing the exhibit artifacts also resulted in TG incurring additional on-site tool storage expenses from November 2000 to August 2001. C4 Supp. 08 1120-21.

As indicated, TG contemplated a limited on-site duration where it would complete all of the low house exhibits in a first mobilization and the Palm House exhibits in a second mobilization. C4 Supp. 08 1127, 1290. As part of its effort to accelerate the project, Clark directed the subcontractor to remobilize on site on February 26, 2001, to complete certain work that had been scheduled as part of TG's subsequent Palm House mobilization. *Id.* at 1124. The change in project scheduling resulted in TG incurring additional mobilization expenses. *Id.* at 1123.

TG's delay claims totaling \$40,667 were computed as follows:<sup>584</sup>

Storage Costs (10/00 – 3/01 @ \$1,600/month)	\$ 9,600
Storage Costs (1/19/00 – 10/1/00)	\$10,800
Additional Material Handling Mobilizations	\$ 2,923
Overhead (10%), Profit (10%), Bond (1.45%)	\$ 3,123
Additional Liability Insurance	\$ 1,210

<sup>583</sup> No TG witness testified at the hearing.

<sup>584</sup> There is a mathematical error in TG's claimed amount. The subcontractor computed, but failed to properly add the claimed overhead/profit/bond markups associated with the storage, mobilization, liability insurance, and inflation costs. C4 Supp. 08 1118. We find that TG's claim here actually totals \$43,702.

Inflation	\$10,882
Overhead (10%), Profit (10%), Bond (1.45%)	\$ 2,752
On-site Tool Storage	\$ 1,965
Overhead (10%), Profit (10%), Bond (1.45%)	\$ 447
<b>Total</b>	<b>\$43,702</b>

C4 Supp. 08 1118; 13 0182; App. Exh. 108.

We find the direct costs incurred by TG for exhibit storage, mobilization, and tool storage totaling \$25,288 to be compensable, reasonable in amount, and sufficiently supported by the record.<sup>585</sup> It is un rebutted that the delays incurred by TG resulted in it moving the exhibit items into and out of storage facilities, and having additional tool storage expenses. C4 Supp. 08 1112 26. While AOC argues that TG provided no proof of its actual payments here, the record includes documentation of the contractual obligation establishing TG's cost for use of the storage facility. C4 Supp. 08 1114, 1118.

TG also asserts that the extended duration of its contract performance entitles the subcontractor to an inflation adjustment of \$10,882. We find no merit to TG's assumption that simply because its performance was extended, the contractor necessarily incurred higher material and/or labor costs. As indicated above, the mechanical application of an inflationary index to originally estimated costs is not an acceptable substitute for proving the requisite elements of liability, causation, and resultant injury. *See Servidone Constr. Corp. v. United States*, 931 F.2d at 861; *Wunderlich Contracting Co. v. United States*, 173 Ct. Cl. at 199.

TG also seeks additional liability insurance costs of \$1,210. However, the Official Procedure for Making Changes in Contracts clause provides that recoverable overhead rate includes the cost of insurance, except for insurance costs relating to direct labor. R4, K0189. As the costs for liability insurance sought here by TG do not relate to direct labor, we find this separately claimed cost is unallowable.

TG also claims a bond markup of 1.45 percent. As with the claim for liability insurance costs, the Official Procedure for Making Changes in Contracts clause establishes that the allowable overhead rate includes the cost of bonds. *Id.* Accordingly, we determine that the separate bond markup claimed here by TG is also unallowable.

Thus, TG has shown \$30,599 in delay damages, which we calculate as follows:

Storage & Handling Costs	\$25,288
Overhead (10%)	\$2,529
Profit (10%)	\$2,782
<b>Total</b>	<b>\$30,599</b>

<sup>585</sup> \$9,600 + \$10,800 + \$2,923 + \$1,965 = \$25,288.

However, as indicated above, this delay was concurrently caused and we must apportion TG's delay damages based on AOC's relative responsibility for the delay. We therefore find that TG is entitled to recover 120.4/421 of \$30,599, that is \$8,751, in delay damages.

### B. Acceleration Claims

TG also claims "acceleration" damages<sup>586</sup> in the amount of \$36,149, which is comprised of four discrete sub-claims, as follows:<sup>587</sup>

Additional Mobilization	\$10,868
Additional Work Performed	\$2,263
Additional Project Management Expenses	\$21,543
Additional Workman's Comp. Insurance	\$1,474
<b>Total</b>	<b>\$36,149</b>

C4 Supp. 08 1122-39; C4 Supp. 13 0182.

TG claims \$10,868 (including markups) in additional mobilization expenses in undertaking an additional, unplanned mobilization in support of Clark's acceleration efforts. As set forth above, Clark directed TG by February 20, 2001 to mobilize to the job site on an additional occasion as part of Clark's effort to accelerate the project. C4 Supp. 08 1124. TG did in fact mobilize to the job site and incurred associated travel costs, which are supported by the record. *Id.* at 1126. We find that TG's claimed direct expenses totaling \$8,653 are both allowable and reasonable, and were incurred as a result of Clark's acceleration in response to AOC's February 5, 2001 cure notice, which constructively accelerated contract performance. Moreover, TG's 10-percent markups for overhead and profit are also allowable under the contract. R4, K0188. However, as noted above, TG has included a 1.45-percent bond markup (\$155) in its claim, which is not allowable under the Official Procedure for Making Changes in Contracts clause, which provides that bond costs can only be recovered as part of the 10-percent overhead rate. R4, K0189. Thus, TG has established acceleration damages totaling \$10,713.<sup>588</sup> However, as discussed above, because the acceleration flowed from concurrently caused delay, TG is only entitled to recover for that proportion of the delay that was excusable. Thus, we find that TG is entitled to recover 122.4/421 of \$10,713, that is, \$3,115.

TG's second "acceleration" claim represents additional work that TG performed on-site as part of the renovation contract (*i.e.*, covering an exposed pipe at the Orchid Tree due to alteration of the installation procedure, covering an adjustment to the plumbing, adding additional rockwork square footage). C4 Supp. 08 1128-35. This claim for \$2,263 is based not on acceleration, but on an alleged change in work requirements. While TG's claim here includes detailed records

<sup>586</sup> As indicated by our discussion below, many of these claims are not actually based upon acceleration.

<sup>587</sup> The four sub-claims each include 10-percent markups for overhead and profit as well as a 1.45-percent markup for bonds.

<sup>588</sup> \$10,868 - \$155 = \$10,713.

related to the costs for additional work performed, *see* C4 Supp. 08 1131-35, it has failed to prove its entitlement to an equitable adjustment. Specifically, Appellant has not demonstrated the reason why TG performed this additional work, or that the “additional work” exceeded the scope of the original contract requirements and was the result of government action or inaction. We therefore deny this claim.

TG also claims additional project management expenses totaling \$21,543 as a result of the extended contract performance period. C4 Supp. 08 1136-37. This claim is also not one based upon acceleration, but is essentially an additional delay claim. TG essentially contends that the 1-year extension of its work on the renovation contract resulted in additional project management attention to the job, and thus, additional project management costs.<sup>589</sup> C4 Supp. 13 0182. As with the project management expenses claimed by other subcontractors, we find that TG has failed to establish the allowability of its claim here in accordance with applicable contract provisions. In this regard, the contract’s No Damages for Delay clause permits the recovery for a government-caused delay of a contractor’s direct costs, including direct labor costs, with the proviso “that the accounting practice of treating these costs as ‘direct’ shall be in accordance with (1) the Contractor’s established and consistently followed cost accounting practices for all work, and (2) FAR Cost Accounting Cost Principles and Procedures (FAR Part 31).” Here TG has failed to establish that its project management expenses were normally treated as a direct, as opposed to indirect, costs of contract performance. The documentation provided by the Appellant in support of its claim contains no evidence establishing how TG normally accounts for its project management expenses; both TG’s claim and the testimony provided on the subcontractor’s behalf are silent regarding this controlling issue.<sup>590</sup> *See* C4 Supp. 08 1137; H.Tr., Dylus, 22:170. As TG has failed to establish that its project management expenses were normally treated such expenses as a direct cost of contract performance, we find Appellant has not established the allowability of this TG claim and it is denied.

Lastly, TG claims that it incurred \$1,474 in additional costs for workman’s compensation insurance due to the schedule delays. C4 Supp. 08 1138-39. This too amounts to a delay rather than an acceleration claim. In support of its claim here, TG submitted a prepared one-page summary consisting of dates, descriptions, and claimed amounts (*e.g.*, “4-Jul-01, Liberty mutual, \$42.00”). C4 Supp. 08 1139. TG provided no documentation or testimony indicating that amounts claimed were actually incurred, or that the amounts related only to the Botanic Garden contract, or that the amounts were for only for the delay period. We find that TG has not sufficiently proven this claim.

In sum, TG is entitled to recover \$3,115 in acceleration damages.

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<sup>589</sup> TG quantified its project management expenses by estimating that project management time averaged 15 hours per week for an additional 52 weeks at \$22.50/hour ( $15 \times 52 \times \$22.50 = \$17,550$ , plus markups, for a total claimed amount of \$21,543). C4 Supp. 08 1137.

<sup>590</sup> TG’s claim for extended project management expenses suggests that the project manager was not a direct cost insofar as the individual was not dedicated to the renovation contract, but managed multiple projects simultaneously.

## **XXII. RENTOKIL'S CLAIM**

### **A. Extra Plant Storage Costs, Clark Change Order No. 810391**

Rentokil claims \$22,475 is excess plant storage costs for storing and maintaining the Botanic Garden plants in Florida for an extra year because of the delays on the project. App. Exh. 104; R4, 11867; H.Tr., Dylus, 22:167. In its post-hearing brief, Appellant recognized that Rentokil had elsewhere claimed and documented a somewhat smaller amount, specifically, \$22,242, which figure is supported by the record. App. PFF ¶ 1048. Respondent does not challenge the reasonableness of this claimed cost. As discussed above, the project was in fact delayed by 360 days by concurrent causes. As discussed above, we can apportion the delay damages to account for the AOC-caused delay, and find that Rentokil is entitled to recover 120.4/421 of \$22,242, or \$6,361.

## **XXIII. COMMERCIAL ROOFING'S CLAIM**

### **A. Step Flashing at East and West Connecting Houses, Clark Change Order No. 810329**

Commercial Roofing claims \$5,983 for furnishing and installing stainless steel flashing where the East and West Connecting Houses abut the East and West Display Halls at the northeast and northwest sections of the project.<sup>591</sup> App. Exh. 6; H.Tr. Sullivan, 2:11, 23-24.

In the original 1930 Conservatory, there was flashing at these locations that was removed during demolition. H.Tr., Sullivan, 2:12. The new flashing in question here was installed and sealed in reglets in (that is, recesses cut into) the limestone walls of the display halls. H.Tr., Thomas, 2:42-46; R4, 10970. The other end of the flashing terminated down into (in other words, was "tied into") the gutter systems of the East and West Connecting Houses, so that the water coming off the exterior wall will hit the flashing and be diverted into the gutters. H.Tr., Thomas, 2:42-46; Sullivan, 2:12. The reglets, where the flashing in question here was installed, were the same that were used in the 1930 Conservatory facility to secure flashing at these locations. *Id.* at 2:44.

Appellant asserts that this work represents a constructive change to the contract because the relevant contract drawings are defective, in that they do not show flashing where the East and West Connecting Houses connected to the limestone walls of the East and West Display Halls. *See* R4, 10970; Drawing A5033, detail I15; Drawing A5035, detail C16; H.Tr., Sullivan, 2:9, 11. Appellant explains that this flashing was necessary to "waterproof" the connections between the connecting houses and the "main building masonry" of the display halls, so as to keep water from infiltrating the connecting houses. H.Tr., Sullivan, 2:9.

AOC responds that the requirement to provide this flashing was included under Clark's performance specification responsibilities under section 13123 of the contract. Appellant disagrees that this flashing was included under section 13123. This is yet another eruption of the parties' ongoing dispute concerning their respective design responsibilities under the contract.

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<sup>591</sup> Respondent does not dispute the reasonableness of the claimed costs.

As discussed above, section 13123 of the contract, governing the provision of the glazing system for the Conservatory, is a complete performance specification, which required Clark to design and provide a glazing system meeting the specified performance goals and characteristics. R4, K0897. In this regard, section 13123 “specifies [a] custom heavy duty quality aluminum framed glass enclosed conservatory.” R4, K0897. The connecting houses are part of the conservatory that is to have an aluminum framed glass enclosed system, whereas the display halls are part of an existing limestone structure (which does not have a glazing system). R4, K0076, K0898.

Section 13123 required the “installation of an entire system including all ancillary connections, methods of attachment of equipment to the structure and incidental metalwork” as well as gutters. R4, K0897. Shop drawings showing construction of the various elements of glazing system, including “gutters” and “flashings” were required to be submitted by the contractor. R4, K0901. Section 13123 also required that the contractor “Engage a Fabricator/Installer for the metal-framed conservatory to assume undivided responsibility for all components including structural design, installation, glazing and weatherproof integrity of the system in place,” and stated, “Responsibility shall also include design, engineering, fabrication, finishing, preparation at the job site, erection and glazing, furnishing and installing anchor assemblies, support framing, related connections, and fasteners as required for compliance with specified performance data.”<sup>592</sup> R4, K0902.

We find that the installation of this flashing was encompassed within Clark’s performance specification responsibilities under section 13123 to design and install an “entire” and “waterproof” conservatory glazing system, including all “ancillary connections” and “incidental metalwork.”<sup>593</sup> R4, 0897, 0902. While Mr. Sullivan testified that he does not believe this flashing can be regarded as “incidental metalwork,” he provides no plausible explanation as to why this term in the performance specification is not sufficiently broad to include flashing that was necessary to waterproof the conservatory where the glazing system connects to the display halls. *See* H.Tr., Sullivan, 2:17. In fact, Clark concedes that, without this flashing, water would infiltrate the connecting houses past the connection of the connecting houses to the limestone walls of the display halls, and this was the reason that it installed the flashing without awaiting AOC’s direction. *See* R4, COF 5463. Thus, notwithstanding that Clark ordered Commercial

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<sup>592</sup> Section 13123 also expressly required the design and fabrication of “[a]luminum flashings within the conservatory assembly.” This section is not applicable to Clark’s provision of the stainless steel flashing here. R4, K0897.

<sup>593</sup> Clark points to various instances where the contract drawings specifically show stainless steel flashing where the conservatory aluminum framed glass enclosed system abuts other sections of the Botanic Garden facility (that is, the Orangerie and South Addition). H.Tr., Sullivan, 2:9-11; R4, Drawing A5042, details R4 and L7. However, unlike the drawing details referenced here by Clark, the drawing detail where Clark believes the flashing for the connecting houses should have been shown was that for the “Connecting House Vent Sash,” a component of the glazing system. R4, Drawing A5035, detail C16. As discussed above, the absence of design details for requirements included in a performance specification does not excuse the contractor from responsibility for providing necessary components to implement the performance specification requirements. *See J.W. Bateson Co., Inc., supra* at 31,560.

Roofing to perform this work, Commercial Roofing is not entitled to recover its costs from AOC under this change claim, since this work was Clark's responsibility under the contract.<sup>594</sup>

#### **XXIV. CONCLUSION**

We find that Appellant is entitled to recover \$2,203,351 plus applicable interest. We calculate this total by first totaling the amounts recovered by Clark on its own behalf for delay, acceleration and change damages, and applying Clark's applicable 1.73-percent overhead and 10-percent profit markups.

We then total the amounts recoverable by each subcontractor for delay, acceleration and change damages, including each subcontractor's applicable markups, and to the total amount found recoverable by all subcontractors, we apply Clark's applicable 10-percent markup. We then add these two totals to determine a subtotal representing Clark's and its subcontractor's total claim recovery.

As noted, there were two change claims (Clark Change Order Nos. 810191 and 810214) involving multiple subcontractors where we found it was appropriate to include Clark's markup in determining the amount recoverable<sup>595</sup> and there was one change claim (Clark Change Order No. 810415) where we found that Clark was not entitled to a markup. We added the total amounts recovered under these three change claims to the subtotal of the amount found recoverable for Clark's plus its subcontractor's claims.

From this total, we deduct the liquidated damages due AOC to determine the total amount recoverable by Appellant.

The following table summarizes our findings with regard to the amounts recoverable by Clark and its subcontractors:

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<sup>594</sup> As pointed out by AOC, the finding that this flashing was part of Clark's responsibilities under section 13123 is consistent with the scope of work stated in Clark's subcontract with Rough Brothers for the section 13123 performance specification work. In this regard, that subcontract provided that Rough Brothers was responsible for "[f]lashings, gaskets, sealants and joint fillers within and at the perimeter of [Rough Brothers'] work, including to adjacent materials either existing or provided by others." C4 Supp. 13 0426.

<sup>595</sup> As noted, Clark and the multiple subcontractors involved in these changes should determine how the amount recovered for these changes should be allocated.

Claimant	Claim	Amount Allowed
<b>Clark</b>		
	Excess General Conditions	\$247,840
	Acceleration	\$127,036
	Excess Design Costs	\$101,243
	Clark Change Order No. 810298	\$104,845
	Clark Change Order No. 810337	\$2,025
	Clark Change Order No. 810340	\$3,958
	Clark Change Order No. 810303	\$4,297
	Clark Change Order No. 810133	\$500
	Clark Change Order No. 810408	\$950
	Clark Change Order No. 810059	\$7,852
	Subtotal	\$600,546
	Overhead (1.73%)	\$10,389
	Profit (10%)	\$61,094
	<b>Clark Total</b>	<b>\$672,029</b>
<b>Subcontractors</b>		
<b>Clark Concrete</b>		
	Clark Change Order No. 810266	\$4,525
	<b>Clark Concrete Total</b>	<b>\$4,525</b>
<b>Judd</b>		
	Clark Change Order No. 810266	\$13,302
	Clark Change Order No. 810233	\$1,268
	Clark Change Order No. 810150	\$11,969
	<b>Judd Total</b>	<b>\$26,539</b>
<b>Standard Iron</b>		
	Acceleration	\$25,332
	Clark Change Order No. 810298	\$68,955
	Clark Change Order No. 810133	\$23,074
	Clark Change Order No. 810302	\$18,123
	Clark Change Order No. 810186	\$9,712
	Clark Change Order No. 810260	\$1,979
	Clark Change Order No. 810117	\$6,764
	Clark Change Order No. 810213	\$1,956
	Clark Change Order No. 810165	\$3,896
	Clark Change Order No. 810408	\$2,878
	<b>Standard Iron Total</b>	<b>\$162,669</b>

<b>Rough Brothers</b>		
	Design and Engineering Delay	\$51,339
	Palm House Delay	\$39,488
	Acceleration	\$61,547
	<b>Rough Brothers Total</b>	<b>\$152,374</b>
<b>Kirlin</b>		
	Acceleration	\$6,662
	Delay	\$45,556
	Clark Change Order No. 810040	\$213,601
	Clark Change Order No. 810150	\$16,335
	Clark Change Order No. 810324	\$42,427
	Clark Change Order No. 810111	\$8,335
	Clark Change Order No. 810400	\$17,262
	Clark Change Order No. 810383	\$18,172
	Clark Change Order No. 810094	\$4,822
	Clark Change Order No. 810083	\$2,219
	Clark Change Order No. 810346	\$3,136
	<b>Kirlin Total</b>	<b>\$378,527</b>
<b>Kalos</b>		
	Delay	\$13,727
	Acceleration	\$7,983
	Clark Change Order No. 810059	\$50,982
	<b>Kalos Total</b>	<b>\$72,692</b>
<b>Megaco</b>		
	Acceleration	\$1,037
	Clark Change Order No. 810093	\$48,351
	Clark Change Order No. 810089	\$11,099
	<b>Megaco Total</b>	<b>\$60,487</b>
<b>Lorton</b>		
	Acceleration	\$5,179
	Clark Change Order No. 810196	\$8,430
	<b>Lorton Total</b>	<b>\$13,609</b>
<b>Ridgeview</b>		
	Delay	\$42,070
	<b>Ridgeview Total</b>	<b>\$42,070</b>
<b>TG Construction</b>		
	Delay	\$8,751
	Acceleration	\$3,115
	<b>TG Construction Total</b>	<b>\$11,866</b>

<b>Rentokil</b>		
	Clark Change Order No. 810391	\$6,361
	<b>Rentokil Total</b>	<b>\$6,361</b>
<b>Subcontractor Total</b>		\$931,719
Clark Markup (10%)		\$93,172
Subcontractor Total with Clark Markup		\$1,024,891
Total Clark Own Claims		\$672,029
<b>Subtotal of Subcontractor and Clark Own Claims</b>		<b>\$1,696,920</b>
<b>Clark Claims that already include Applicable Clark Markup</b>		
	Clark Change Order No. 810191	\$61,903
	Clark Change Order No. 810415	\$39,348
	Clark Change Order No. 810214	\$462,300
	<b>Subtotal of Clark Claims Already Including Applicable Clark Markup</b>	<b>\$563,551</b>
<b>Subtotal (Subcontractor and Clark Own Claims and Clark Claims Already Including Applicable Clark Markup)</b>		<b>\$2,260,471</b>
<b>Liquidated Damages</b>		<b>&lt;\$57,120&gt;</b>
<b>TOTAL AWARD</b>		<b>\$2,203,351</b>

Lastly, the contract contains a provision that requires interest be recoverable by the contractor in the event that an appeal is filed from a contracting officer's decision.<sup>596</sup> We find that Appellant is entitled to the recover interest on the additional monies due as a result of Clark's claim and final decision from the appeal date of August 29, 2002.

<sup>596</sup> The contract provided, in pertinent part:

If an appeal is filed by the Contractor from a final decision of the Contracting Officer under the Disputes paragraph of this contract, denying a claim arising under the contract, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the Contractor. Such interest shall be at the rate determined by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat. 97, from the date the Contractor furnishes to the Contracting Officer his written appeal under the Disputes paragraph of this contract, to the date of (1) a final judgment by a court of competent jurisdiction, or (2) mailing to the Contractor of a change order, or a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a contract appeals board.

R4, K0049.

The appeal is sustained in part.

Dated: November 23, 2004



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James A. Spangenberg  
Chairman  
Contract Appeals Board of  
the Joint Committee of  
Congress on the Library



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Guy R. Petrovito  
Contract Appeals Board of  
the Joint Committee of  
Congress on the Library



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Louis A. Chiarella  
Contract Appeals Board of  
the Joint Committee of  
Congress on the Library