UNITED STATES
CIVILIAN BOARD OF CONTRACT APPEALS

THIS OPINION WAS INITIALLY ISSUED UNDER PROTECTIVE ORDER AND IS BEING RELEASED TO THE PUBLIC IN ITS ENTIRETY ON MAY 5, 2017

CBCA 2862 GRANTED IN PART; CBCA 4085, 4802 GRANTED: April 14, 2017

CBCA 2862, 4085, 4802

TURNER CONSTRUCTION COMPANY,

Appellant,

v.

SMITHSONIAN INSTITUTION,

Respondent.

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Scott D. Cessar of Eckert Seamans Cherin & Mellott, LLC, Pittsburgh, PA, counsel for Subcontractor March-Westin Company.

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Before Board Judges **KULLBERG**, **SULLIVAN**, and **CHADWICK**.[1]

SULLIVAN, Board Judge.

Appellant, Turner Construction Company (Turner), filed three appeals from contracting officer decisions issued by respondent, the Smithsonian Institution (Smithsonian or SI), concerning matters arising on its contract to provide design and construction services in a long-term, multiple-phase project entitled "Public Space Renewal Project at the National Museum of American History." *Turner Construction Co. v. Smithsonian Institution*, CBCA 2862, 13 BCA ¶ 35,290, at 173,252; *see Turner Construction Co. v. Smithsonian Institution*, CBCA 2862 et al., 15-1 BCA ¶ 36,139, at 176,388.

Turner's first appeal (docketed as CBCA 2862) was of the contracting officer's decision denying its claim for approximately $14 million, which included Turner's claim for general conditions costs of approximately $7 million and subcontractor claims for delay and disruption costs of approximately $7 million. In an initial ruling, the Board held that the parties had failed to agree upon a firm fixed price for the base contract work to be performed by Turner and that Turner was entitled to be paid a reasonable price for that work. *Turner Construction*, 13 BCA at 173,260.

Following that initial ruling, Smithsonian conducted an audit of all the costs incurred by Turner on the project. Based solely upon the results of that audit, the contracting officer issued a second decision, finding that Turner had been overpaid by approximately $40 million. To effect repayment, the contracting officer denied Turner's claim in its entirety and asserted a claim for an additional $24.5 million paid to Turner on the contract. Turner also appealed that decision to the Board, docketed as CBCA 4085.

Turner filed a second claim in 2015, seeking costs of approximately $440,000 that it incurred to install a second steam generator in the museum. The contracting officer denied Turner's claim, and Turner appealed, docketed as CBCA 4802. The second and third appeals were consolidated with the first appeal when they were filed.

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[1] When the first appeal was filed, a panel composed of Judges Somers, McCann, and Kullberg was assigned to hear these appeals. The matter was transferred to Judge Sullivan on December 17, 2014. Upon the retirement of Judge McCann, Judge Walters was assigned to the panel. Upon the retirement of Judge Walters, Judge Chadwick was assigned to the panel.

The contract between Turner and Smithsonian, by its terms, is not subject to the Contract Disputes Act (CDA). 41 U.S.C.§§ 7101-7109 (2012). Exhibit 1_F at 320.[2] Instead, the Disputes clause of the contract provides that a contractor may appeal a contracting officer's decision to the Secretary of the Smithsonian Institution. *Id*. at 321. By memorandum of agreement between Smithsonian and the Board, dated June 5, 2012, the Board agreed to hear and decide the appeals arising from this contract. *Turner Construction*, 13 BCA at 173,258.

The Board conducted a hearing in November 2015. The Board heard testimony from thirty witnesses over fourteen days. The parties submitted approximately 4000 exhibits as part of the appeal file and voluminous post-hearing briefing.

The Board's role in this matter is to find a reasonable price for the construction services that Turner provided in the renovation of the American History Museum. We are tasked with this assignment because, despite Smithsonian's promises both in the original contract and during contract performance, Smithsonian never negotiated a firm fixed price for much of the work Turner performed. Smithsonian has a renovated museum, and the Board is deciding herein what additional sums are owed to Turner for that building. The difficulty in this case was principally of Smithsonian's own making. If Smithsonian had agreed to a firm fixed price for the construction, Turner would have been bound to that price, subject to adjustment for changes and other increases. Having failed to execute the bargain prior to the provision of services, Smithsonian cannot reap the benefits of a bargain it wishes it had struck.

Smithsonian's arguments are rooted in its continued belief that the parties agreed upon a price, which the Board should adjust or not adjust based upon the provisions of the contract, most notably the Equitable Adjustment clause. Because the parties did not agree upon a price for the base contract work, as we held in our earlier decision, *see* 13 BCA at 173,259-60, the Board's effort is not controlled by those provisions. Moreover, while the Board does not find that Smithsonian breached the contract by failing to negotiate a price, that failure leaves Smithsonian without many of the safeguards and defenses that would have been available to it under a firm fixed-price agreement.

The Board finds that Turner and its subcontractors incurred costs to address problems for which Smithsonian is responsible—hazardous waste abatement, mechanical, electrical and plumbing (MEP) interferences, and continuing design changes. On this record, Turner may recover based upon a quantum meruit theory. Turner's subcontractors used more conventional methods to attempt to prove their disruption claims arising from these same

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[2] All exhibits are found in the appeal file.

issues, and some succeeded. However, none of Turner's subcontractors proved their claims for extended overhead flowing from contract delays.

Regarding Smithsonian's claim for overpayment based upon its audit of Turner's project costs, the Board finds that Smithsonian has not met its burden. While the audit exposed areas that merited further investigation, Smithsonian did not undertake those necessary steps. Instead, it simply demanded repayment and has failed to establish a proper basis for that demand.

We decide that Turner is owed an additional $3,149,638 over what it has been paid to date for the renovation of the museum. Turner may also recover $2,803,430 on behalf of its subcontractors. Pursuant to the contract, Turner may also recover interest on these amounts, calculated from the dates of its claims to the Smithsonian.

Findings of Fact

I. Contract Terms and Timeline

A. Scope of Work/Existing Conditions

In May 2002, Smithsonian awarded a contract to "lead a design/build team for the National Museum of American History Public Space Renewal Project." Exhibit 1_A.[3] The design and construction services were divided into seven separate phases. The first phase was the "concept phase," to be performed for a fixed price of $250,000. Exhibit 1 at 2. The contract listed six additional construction/design phases as options, for which the "[t]erms and conditions, prices, schedule and other relevant matters will be negotiated." Exhibit 1_A at 21.

In September 2005, Smithsonian awarded Turner a follow-on contract to "Revitalize National Museum of American History (NMAH), Behring Center, Public Space Renewal, Package II-B," to "[p]rovid[e] design services to revise 35% design development package, construction phase documents at 65%, 95%, and 100% construction documents supporting the central core infrastructure system of the building," as well as soft demolition supporting

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[3] The contract was originally awarded to the architectural firm Skidmore, Owings & Merrill LLP (SOM), but in early 2004, the parties agreed that the contract with SOM would be novated and that Turner would assume the responsibilities under the SOM-SI contract. Exhibit 2_C at 6. Turner agreed to be "bound by and will perform in accordance with the requirements contained in" the SOM contract. *Id*. at 7.

the central core infrastructure system. Exhibit 5 at 1; Transcript at 752-53.[4] Smithsonian agreed to pay Turner a "not-to-exceed [NTE] price" of $10,645,174.12, for (1) architect/engineer (A/E) design – $4,109,719.16, (2) long lead item requisitioning – NTE $6,000,000, and (3) soft demolition – NTE $535,454.96. Exhibit 5 at 1, 4.

The contract described the requirements to provide design documents at various stages of the design. It required "[t]he 95% construction documents [to be] complete and biddable in every aspect. Only very minor changes should be required after review." Exhibit 1_H at 395. The contract contained two broad clauses regarding Turner's responsibility for the design. The first made Turner responsible for accuracy and quality of its design and required Turner to "correct or revise any errors or deficiencies in its designs, drawings, specifications . . . without additional compensation." Exhibit 5 at 6. The second clause made Turner responsible for preparing change order documents at no expense to Smithsonian, if the changes resulted from deficiencies in the Turner design, even if a deficiency was due to incomplete information about existing conditions. Exhibits 1_H at 391, 5_A at 14.

There was also a requirement that sole-source items not be specified in the design absent approval of the contracting officer's technical representative (COTR). Exhibit 1_H at 421. This clause is in a section of the contract that pertains to submission of construction documents by the architect/engineer. *Id*. at 419 (titled "CONTENT of 95% Construction Documents Submission").

The scope of work noted the age of the building and work that had been performed previously:

> Since its opening in 1964, [the museum] has undergone many changes reflecting the evolving needs for the display of objects, the trend toward more thematic and story-driven exhibits, larger public gathering areas, the modernization of public facilities, and upgrades to the infrastructure. However, with any highly visited public facility, the needs of our visitors, staff and collections are constantly changing, as are building codes and building technologies.

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[4] Seeking to emphasize the design-build nature of the project, Smithsonian contends that this second contract was a work order under the first contract. Smithsonian Proposed Findings of Fact (PFF) ¶ 119. Turner asserts that it held two contracts with Smithsonian, but does not disavow its obligations and responsibilities under the original contract. Because this disputed issue does not figure into our analysis, we simply describe the contractual requirements as flowing from a single contract.

Exhibit 1_A at 33. The contract directed the A/E to contact the Smithsonian's archivist to obtain access to the existing drawings for the building. *Id*. at 37. The contract advised that the existing drawings would be found on various media and "[t]he accuracy of these drawings in documenting the existing conditions cannot be guaranteed." *Id*.

The contract required Turner to conduct a survey of the existing conditions in the museum:

> The Architect Engineer Design Team shall perform all pre-design, existing conditions surveys, programming, conceptual design, schematic design, design development, construction documents, construction, construction management, and all other design and engineering services as necessary to complete the NMAH-BC Public Space Renewal Project that is described in the basic scope of work and unpriced options.

Exhibit 1_C at 56-57; Exhibit 1_H at 393. Smithsonian agreed to provide access to the data files it had to assist the A/E in "determining the existing conditions" but warned that "[f]iles are not warranted to show present existing conditions at the site." Exhibit 1_H at 408 (Clause 4.6, Existing Conditions and SI Data Files). Smithsonian's Deputy Director of the Office of Planning, Design and Construction (OPDC) testified that the purpose of this warning was to "invite [contractors] . . . to make sure that they take whatever opportunities they can to develop a better understanding of what the building is and how it operates." Transcript at 3645.

The contract also required Turner to abate hazardous materials found in the building, including asbestos and lead paint, during construction in accordance with applicable laws and regulations. Exhibit 1_H at 403.

B. Contract Clauses at Issue in Smithsonian's Audit

The contract contained Smithsonian's own Equitable Adjustment clause (SI 252.243-71) that supplemented the first Changes clause, Federal Acquisition Regulation (FAR) 52.243-4. Exhibit 1_F at 270. The Equitable Adjustment clause permitted the COTR to request itemized proposals for change work. Itemized proposals would include an "estimate of the time required to perform the change" and "itemize[] with unit quantity and unit costs segregated by labor and materials for the various components of the change." *Id*. The clause also required the submission of daily time and material tickets for any change work that the contracting officer elected to have performed on a time and materials basis. *Id*. at 274.

The Equitable Adjustment clause limited overhead and profit recoverable by the contractor or a subcontractor to 21% for work performed by its own forces and 10% for work performed by other subcontractors. Ex. 1_F at 274. The clause further required Turner and its subcontractors to include in overhead "unless specified by [Smithsonian] [amounts] for project management; insurance, except workers compensation and general liability, field and office supervisors, engineers and their assistants, watchmen, use of small tools, incidental job burdens and general home office expenses." *Id*. at 275. The clause permitted Turner to include in the direct costs of a change the costs of any foreman labor. *Id*. at 270-71.

Finally, this clause limited the types of costs that could be sought in change order proposals:

> The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called impact costs, labor inefficiency, wage material or other escalations beyond the prices upon which the proposal is based and which are identified pursuant to this Clause, and which the Contractor, its Subcontractors or Suppliers may incur as a result of delays, interference, suspensions, changes in sequence or the like, from whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all changes in the Work performed pursuant to this Clause. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of his costs and specified markups for overhead, profit and/or commission as set forth in this Clause and an extension of the Contract Time, but only in accordance with the provisions of the Contract Documents.

Exhibit 1_F at 275.

The Audit clause required Turner to "maintain books, records and accounts of all costs in accordance with generally accepted accounting principles and practices" and permitted Smithsonian to conduct an audit in specified circumstances, including:

> In the event of a disagreement between the Contractor and the SI over the amount due the Contractor under the terms of this contract;
>
> To check or substantiate any amounts invoiced or paid which are required to reflect the costs of the Contract, or the Contractor's efficiency or effectiveness under this contract or in connection with extras, changes, claims, additions, back-charges, or other, as may be provided for in this contract;

Exhibit 1_F at 286. The clause further permitted Smithsonian to audit Turner's records despite payments previously made for performance:

> The S.I. will make all payments required of it under this Contract subject to audit, under circumstances stated above, which audit may be performed at the S.I.'s option, either during the Contract time period or during the above record retention time period. Regardless of authorization, approval or acceptance, signatures or letters which were given by the S.I. and are part of the S.I's control systems or are requested by the Contractor, the payment made under this Contract shall not constitute a waiver or the S.I.'s right to audit, nor shall payments constitute a waiver or agreement by the S.I. that it accepts as correct the billings, invoices or other charges on which the payments are based. If the S.I.'s audit produces a claim against the Contractor, the S.I. may pursue all its legal remedies even though it has made all or part of the payments required by the Contract.

Id. at 286-87. The Audit clause provided for reimbursement of amounts overpaid: "If such audit discloses an overpayment, the Contractor shall have the obligation to reimburse the S.I. for the amount of the overpayment." *Id*. at 287.

The contract also contained a flowdown clause requiring that subcontractors be bound by its terms and assume all of the same obligations that Turner had toward Smithsonian. Exhibit 1_F at 156.

The contract did not require that Turner certify that it had paid its subcontractors prior to seeking payment from Smithsonian. Instead, Turner had to certify that "[p]ayments to subcontractors have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payments" requested. Exhibit 1_F at 294 (FAR 52.232-5, Payments Under Fixed-Price Construction Contracts).

The contract required that Turner obtain insurance and bonds for the work. Exhibit 1_F at 171-75. It required Smithsonian to pay bond premiums upon proof of payment of these costs by Turner. *Id*. at 295.

Finally, the Disputes clause provided for the payment of simple interest on claims, at a rate fixed by the Secretary of the Treasury, running from the date the contracting officer received the claim. Exhibit 1_F at 321. We construe this interest calculation to be the same as the one required by the CDA, 41 U.S.C. § 7109.

C. Contract Modifications

1. Modification 7

The fixed price for the construction phase was to be negotiated at the completion of the 95% construction documents. Exhibit 6 at 22; *Turner Construction Co.*, 13 BCA at 173,258. On September 16, 2006, Turner completed its 95% construction documents, Exhibit 9 at 11-24, and on October 30, 2006, Turner submitted its 95% pricing proposal. Transcript at 780. Turner attached to its price proposal a document titled, "Assumptions & Clarifications," which identified what items or issues were included or excluded from Turner's price proposal. *Id*. at 789-90; Exhibit 9 at 3-9. With these assumptions and clarifications, Turner provided several important caveats regarding its pricing of the construction work:

> General
>
> . . . .
>
> 9. During the construction period despite Turner's best effort, it cannot guarantee that the conditioned space of the building can be maintained at 50% humidity and 70 degrees F. We have not included any supplementary HVAC [heating, ventilation, and air conditioning] or Humidity equipment to try to maintain these environmental conditions.
>
> . . . .
>
> 16. Turner has not included any cost for unforeseen conditions.
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> . . . .
>
> 24. The design and the budget are both based on existing condition inspections and as-built documents provided by The Owner and included here as the attached list. [*See* Exhibit 9 at 10.] Neither SOM or Turner were able to verify all existing conditions in the field as they were limited to visual inspections only. Inspections requiring demolition to observe were permitted by [t]he Smithsonian only in areas that were not open to the public, had no artifacts or exhibits in place and were not operational. All verification inspections that were completed are reflected on the 95% drawings issued September 15th, 2006.

25. Turner has included only the work shown on the 95% Construction Documents as identified on the attached document list dated October 5, 2006.

. . . .

31. Turner's design team has based the [Public Space Renewal Package] design on existing building drawings provided by Smithsonian.

. . . .

Hazardous Materials

2. This proposal includes a $80,000 [a]llowance for [a]batement of hazardous materials noted in the project specific abatement survey.

Demolition

. . . .

3. Turner excludes the cost of demolition of any systems, piping, ductwork, wiring, fixtures equipment etc. not shown on the contract documents.

. . . .

Mechanical / Plumbing

. . . .

2. Turner excludes the cost to relocate any of the existing MEP systems unless shown on the contract documents.

. . . .

8. This proposal includes a HVAC system designed to the loads provided by [t]he [o]wner to SOM/[Turner's A/E for mechanical systems].

Exhibit 9 at 3-5, 7. The as-built drawings, referenced above, included the original drawings for the construction of the museum (prepared by architects McKim, Mead, and White) as

well as other drawings from previous projects at the museum. Exhibit 9 at 10. The drawings bear dates from 1959 until 1996, although most of the drawings are not dated. *Id.*

In December 2006, the parties executed modification 7, which provided additional funding for the construction of the Public Space Renewal and Star-Spangled Banner (SSB) projects. Exhibit 7_G. The modification noted that it was "a funding action only [and] is not intended to represent a total firm fixed amount obligation on the part of the Contractor." *Id.* at 137. Smithsonian directed Turner to undertake construction services in accordance with the 95% construction documents, dated September 16, 2006, and stated that "[o]nce construction activities [are] definitized, funding will represent a firm fixed contract amount." *Id.* at 138. The parties further agreed that, "[w]ith the exception of the changes made herein, all terms and conditions of [the contract] remain in effect." *Id.* "[B]ecause Turner and SI were in the process of negotiating the 95% construction documents price as of December 27, 2006, Modification 0007 did not establish a fixed construction price." *Turner Construction Co.*, 13 BCA at 173,254.

The Board previously found that the parties never agreed upon a fixed price for the construction phase of the project. *Turner Construction Co.*, 13 BCA at 178,259. After a thorough review of the record and the briefing, we see no basis to disturb that finding.[5] The significant amount of testimony that both parties elicited regarding whether they agreed on Turner's assumptions and clarifications does not matter in the Board's analysis. What does matter is that Turner's price proposal for the base contract work was conditioned upon these assumptions, and the parties never agreed on the price of the base work.

2. Modifications 8 through 32

Smithsonian issued a total of thirty-two contract modifications, each of which added funding, up to a final contract funding of $75,030,697.77. Exhibits 7_H through 7_FF. Some of the modifications funded specific elements of construction phase work. *See, e.g.*, Exhibit 7_J (modification 10, dated May 4, 2007, accessibility shell, SSB work, design and engineering of the abstract flag and Lemelson Center). Other modifications included change order work, including abatement of hazardous materials. *See, e.g.*, Exhibit 7_K (modification 11, dated May 4, 2007, repair of sprinkler system and abatement work). Still other modifications funded design changes, referred to as addenda, made after submission of the 95% drawings. Exhibit 7_U (modification 21, dated November 16, 2007).

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[5] Although the parties did not agree upon a final contract price for the base contract work, Turner invoiced Smithsonian based on the detailed schedule of values in the November 21, 2006, price proposal and its revised counterpart in the January 19, 2007, cost proposal, which is more general in its cost breakouts. Transcript at 825-28.

3. Substantial Completion Date–Modifications 16 and 26

Smithsonian issued two modifications to the contract related to the date for substantial completion. In September 2007, the parties executed modification 16, which established a substantial completion date of June 20, 2008. Exhibit 7_P. However, the parties also "mutually agreed and understood that some work will likely extend past the substantial completion date." *Id*. at 599. The parties further agreed that the modification was a funding action only and that a large portion of the contract price was undefinitized. *Id.* The parties listed modifications that contained work for which a price had not been definitized. *Id.* at 600.

Shortly after the initial substantial completion date was set, the parties exchanged correspondence about the possibility of extending it. Smithsonian was willing to extend the date, but wanted either an agreement that all the delays were concurrent and, therefore, at no cost to Smithsonian, or an analysis showing that the delays were Smithsonian's responsibility. Exhibit 862. Turner responded with an explanation of the nature of the delays it believed it had experienced. Exhibit 933 at 4. Turner estimated that the cost of these delays could be between $3 and $5 million. *Id*. at 1. To this document, Turner attached a schedule analysis. *Id*.

The back-and-forth on schedule and cost continued throughout the spring of 2008. Respondent's PFF ¶ 396. On July 8, 2008, Smithsonian unilaterally issued modification 26, which moved the substantial completion date back to October 31, 2008, and deemed thirty-five days of delay to be compensable. Exhibit 7_Z. The determination of thirty-five days of compensable delay was based upon an analysis of Turner's schedule by Hill International. Respondent's PFF ¶ 400. Based upon this determination, Smithsonian unilaterally made an equitable adjustment in the amount of $1,420,837, for "differing site conditions, extended overhead delays and other factors." Exhibit 7_Z at 1640.

Turner presented no evidence that it requested a further schedule extension past October 31, 2008. The superintendent of Welch & Rushe, Inc., Turner's mechanical and plumbing subcontractor, testified that everyone was working hard to permit President George W. Bush to open the SSB exhibit in November, before he left office. Transcript at 2679. The former contracting officer testified that time extensions of the project cost Smithsonian money, both for contract management by Smithsonian personnel and because the museum shops, which bring in substantial revenue, remained closed. *Id*. at 3818. Turner substantially completed the project on October 31, 2008. *Turner Construction*, 13 BCA at 173,258.

II. Contract Performance Issues

Turner, its subcontractors, and Smithsonian all presented evidence regarding performance issues that arose during the project. According to Turner and its subcontractors, Smithsonian is responsible for issues that underlie their claims for delay and disruption: hazardous material abatement, MEP interferences, and continuing design changes. Smithsonian disputes that it is responsible for these issues and argues that Turner is responsible for poor subcontractor performance and design issues that increased its performance costs.

A. Hazardous Material Abatement

Turner and its subcontractors discovered extensive quantities of two hazardous materials that required abatement during the project: asbestos and lead paint. In September 2006, MACTEC, Turner's hazardous waste consultant, provided Turner a survey of hazardous material in the building, which reported the presence of these two materials (four locations for asbestos and three locations for lead paint). Exhibit 332 at 5-11. MACTEC also advised Turner that there was probably additional hazardous material hidden from view. Exhibits 332 at 7; Transcript at 717-18.

Turner subcontracted with APRO Enterprises, Inc. (APRO) for demolition services.[6] Exhibit 3067 at 19-28. After demolition began in October 2006, APRO encountered asbestos behind existing walls and above existing ceilings. Transcript at 3381. In December 2006, because APRO was already mobilized for demolition work, Turner subcontracted with APRO for hazardous material abatement. *Id*. at 550-51. APRO's contract was for a fixed price of $77,200, a contract amount based on the MACTEC survey and Turner and APRO's inspection of the quantities of hazardous material at the specific locations identified by MACTEC. *Id*. at 3381-83; Exhibit 3167 at 12-37. Turner and APRO anticipated that additional hazardous material would be found and stated in the subcontract that "the total scope is therefore unknown." Exhibit 3167 at 35.

In May 2007, Turner subcontracted with Air Services for hazardous material abatement work. Exhibit 509; Transcript at 719-20. Turner needed to augment APRO's abatement work because APRO could not keep up with either the demolition or abatement schedule. Transcript at 720.

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[6] Turner also subcontracted with Basic Services, another demolition firm. Exhibit 350.

Smithsonian's resident engineer and COTR testified at the hearing that the scope and effort of the abatement work on the project was not difficult and that the abatement problems were caused by APRO. Transcript at 3942, 4163. These opinions are contradicted by the record. During the course of the project, APRO encountered asbestos-containing material in forty areas of the museum and lead-based paint in twenty areas. *Id*. at 3388-89. All of this material had to be abated in a very time-consuming process.[7] The work could last for a couple of days or weeks, depending on the size of the area and the quantities of hazardous material. *Id.* at 3405-11.

When hazardous material was discovered, all other work in the area would cease and, if it was asbestos, a containment area would be set up, effectively shutting down those areas of the project until the abatement was complete. Transcript at 1110, 3405-11. For example, the project manager for March Westin Company, Inc., Turner's structural steel subcontractor, testified about discovering lead paint on the steel beams where his company was supposed to weld new beams. *Id*. at 1979; Exhibit 3766.[8] Similarly, Welch & Rushe's project manager testified about discovering black mastic (tape covering pipes that contains asbestos) on duct work and piping that needed to be moved. Transcript at 2385-87. As a result of these stoppages, subcontractor crews repeatedly were required to stop and find other areas of the project to work on until the abatement areas were released. *See, e.g.*, *id*. at 2427.

On November 15, 2007, Air Services stopped performing the abatement work, blaming Smithsonian's purported slow approval and payment process, including Smithsonian's reduction of payments for abatement costs after the abatement work had been completed. Transcript at 1762-63. On December 12, 2007, Turner subcontracted with

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[7] When APRO or another subcontractor found hazardous material (lead paint, asbestos, and black mastic), a technician would have to confirm that the material was hazardous and submit an abatement plan to Turner for approval. For asbestos, the area would be sealed off to all of the subcontractor personnel while the remediation was undertaken. Often efforts required scaffolding to be set up so that remediation personnel could reach the area. For lead paint, a chemical paint stripper was applied and then the paint was scrapped off by hand. After the work was completed, a technician would reinspect the area to confirm the hazardous material was abated. Transcript at 3407-08. APRO could then demobilize all abatement equipment and continue demolition work. *Id.* at 3410.

[8] March Westin's project manager testified that March Westin did not know about the presence of lead paint on the concrete-encased steel beams when it bid the project. Transcript at 1976. The MACTEC survey does not mention lead paint on steel beams, Exhibit 332, and Smithsonian does not identify any evidence to the contrary. Respondent's PFF ¶¶ 1486-87.

Diversified Environmental to replace Air Services. Exhibit 896. According to Zafar Farooqi, Turner's schedule and delay expert, the abatement work in the mechanical shafts resumed on December 20, 2007. Exhibit 5045 at 18.

The abatement work continued from the beginning of the project through 2007. Transcript at 233, 1110-11. Turner and its subcontractors performed more than $1 million in abatement work. *Id*. at 869, 3723-24. Smithsonian contracting personnel recognized at the time that the extent of hazardous material abatement required on the contract was "an unforeseen condition." *Id*. at 4718-19; Exhibits 4826, 5355 at 4.

B. Mechanical, Electrical, and Plumbing Interferences

1. Existing Conditions Survey

Turner and its subcontractors had to address numerous MEP interferences. According to the report of the survey of existing conditions, dated July 15, 2004, the Turner team both reviewed the existing drawings and conducted a field survey of the building. Exhibit 320 at 4. During the field survey, the Turner team verified the room layout for the basement and fourth and fifth floors and "visually confirmed" the plans for the public areas of the museum, where possible. *Id*. However, because the museum was still open to the public, the survey team was limited to visual and other non-invasive inspection activities, meaning the team could not open walls or ceilings. Transcript at 755-56. If the systems or wiring were located above a hard ceiling, the team would not have seen those systems during this survey. *Id*. at 1224. In the survey report, the team noted that further design work would have to be undertaken when system components above unaccessible ceilings were confirmed:

> The emphases for our field survey were the clear dimensions for the public space areas in the museum and material finishes. Any systems components located above inaccessible ceilings or otherwise not readily accessible were not visually confirmed. As a result, all drawings shall be field verified before performing design work in any given area.

Exhibit 320 at 4.

2. Effect of MEP Interferences Upon Coordination Drawings

After construction began, Turner discovered many MEP interferences that slowed the progress of construction when the interference had to be addressed before coordination drawings could be finalized. The interferences involved piping, conduits, wiring, and other systems. While Smithsonian points to its correspondence with Turner in which it states that

identified MEP interferences were visible in the basement or the mechanical rooms, Respondent's PFF ¶ 1049, Turner's subcontractors described discovering MEP interferences when the hard ceilings, often more than one, were removed. *E.g.*, Transcript at 2395, 2890. Several witnesses described "a rat's nest of wires" that would fall from the ceiling when exposed. *Id.* at 2434-36, 3299-303; Exhibit 4876 at 51-52.[9]

Once the interferences were discovered, subcontractors were required to investigate and decide how to remove, relocate, or establish temporary service for the systems. Welch & Rushe required several additional experienced crew members to conduct this investigation work. Transcript at 2409-10. In investigating the systems, subcontractors often traced the piping or wires to outside the designated construction area, resulting in further delays as subcontractor personnel had to wait for a Smithsonian escort into the still-occupied portions of the museum. *Id*. at 2395-98, 3299, 3303. Discovery of these interferences and the effort needed to address them caused delays in the preparation of the coordination drawings. *Id*. at 2436-37. Welch & Rushe was assigned the lead responsibility for the coordination drawings, Exhibit 3050 at 103, but M.C. Dean, Inc., Turner's subcontractor for the installation of electrical, security, fire alarm, and telecommunications systems, and Turner's fire sprinkler subcontractor also contributed to these drawings. Transcript at 2430.

3. Agreement on MEP Interferences

Some of these interferences were depicted on the existing building drawings, but many were not. Transcript at 1731. To address the costs and delays arising from these interferences, senior management at Smithsonian and Turner agreed in December 2007 that Smithsonian would pay for interferences not shown on the existing building drawings, and Turner would absorb the cost of those that were depicted. *Id.*; Exhibit 117 at 2.[10] Turner tracked the MEP interferences it discovered on a field log that was provided to Smithsonian

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[9] This case proved the adage "a picture is worth a thousand words." The Board was shown pictures of the MEP interferences during the testimony of several witnesses, and these pictures uniformly showed a mess of wires, ductwork, and piping in areas after ceilings had been removed. *E.g.*, Exhibit 4735.

[10] The COTR initially rejected Turner's request for additional compensation to address these interferences based upon the mechanical, electrical, plumbing, and structural general notes in SOM drawings. *See, e.g.*, Exhibits 107, 3403; Transcript at 4077-80. The drawing notes provided that the work by subcontractors was to be coordinated with other trades "at no additional cost to the owner." Exhibit 107. However, these notes do not address the existence of MEP interferences that were not shown on existing drawings and were not visible prior to demolition.

on a bi-weekly basis. Transcript at 1731-34; Exhibit 4780. According to the log, Turner found approximately 200 MEP interferences from January 2007 through January 2008, only fifty-one of which were depicted on the existing drawings. Exhibits 4780, 5057 (updated version of Exhibit 4780).[11]

During the hearing, Smithsonian's Deputy Director of OPDC testified that Smithsonian's position was that if interferences could be discovered by review of the existing drawings (McKim, Mead documents, as well as others), the 2004 existing conditions survey, interviews Turner could have and should have had with Smithsonian personnel, or soft demolition prior to the full demolition, then Turner should bear the cost of the MEP interferences. Transcript at 3689. Smithsonian highlights MEP interferences that were shown on existing drawings, but these interferences either were noted before the agreement between senior management, *see, e.g.*, Exhibit 885, or are captured on the log prepared by Turner. Respondent's PFF ¶ 377 (noting fifty-four instances in which the MEP interference is noted on the existing drawings).

C. Addenda to Construction Documents

Turner issued a series of addenda to the 95% construction documents that, in part, included further design changes requested by Smithsonian. The parties' negotiations regarding the scope and price for these addenda continued through September 2007. *Turner Construction Co.,* 13 BCA at 173,255.

Turner issued addendum 1 on January 17, 2007. Exhibit 358. Addendum 1 incorporated Smithsonian's comments on its review of the 100% drawings.[12] Turner issued addendum 2 on April 13, 2007, and issued a revised version on July 18, 2007. Exhibit 617

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[11] Mr. Farooqi testified as to his analysis of this log, but that analysis took place after his deposition in this matter at the request of Turner's counsel. Smithsonian objected to Mr. Farooqi's testimony regarding his review of this log on this basis. The Board has not considered Mr. Farooqi's testimony about this log, but is able to discern what the log says on its face about whether the MEP interferences could be determined from the existing drawings.

[12] It is unclear from the record whether the 100% construction documents and addendum 1 were submitted concurrently, or were substantively distinguishable from each other. *Compare* Appellant's PFF ¶ 93 (Addendum 1 "included final dimensional configurations, coordination with the SSB dimensions, and incorporated 100% review comments") *with* Respondent's PFF ¶ 236 (Addendum 1 "contained revisions to complete the Contract Scope of Work from the 95% to the 100% Construction Documents").

at 3, 33. Addendum 2 incorporated final drawings for a fire suppression system for the SSB chamber, fire zone changes, and mechanical specifications. Transcript at 829-30. The contracting officer directed Turner to proceed with addenda 1 and 2 on July 19, 2007. Exhibit 18.

Turner issued addendum 3 on June 27, 2007. Addendum 3 incorporated revisions to electrical and mechanical systems to implement Smithsonian's request to upgrade switch gear. Exhibits 7_S at 4, 617 at 44-45; Transcript at 830. Smithsonian directed Turner to proceed with addendum 3 on July 24, 2007. Exhibit 7_S at 2.

Turner issued addendum 4 on July 11, 2007. Addendum 4 revised the design for the accessibility office, revised the door into the SSB chamber, and added signage. Exhibit 617 at 46-48; Transcript at 830. Smithsonian directed Turner to proceed with addendum 4 on November 16, 2007. Exhibit 7_S at 2.

On August 1, 2007, Turner directed its subcontractors to implement the work in addenda 1 and 2 and to prepare shop drawings and submittals based upon addenda 1 through 4. Exhibit 651.

Turner issued addendum 5 on August 29, 2007. Addendum 5 incorporated the SSB exhibit package. Exhibit 617 at 49-50; Transcript at 831. The Board is unable to determine from the record when the notice to proceed was issued for this addendum.

Turner and its subcontractors testified that the continuing design changes delayed development of the coordination drawings. Transcript at 93-94. As Welch & Rushe's program manager explained, even if an addendum did not require work by a particular trade, that trade was still required to review the new work presented by the addenda and the plans of the other trades to make sure that the work could still all be coordinated. *Id*. at 2433.

Based solely upon an email message from SOM, Smithsonian asserts that addenda 1 and 2 were necessary to address incomplete construction documents. Exhibit 821. Smithsonian also notes that Turner delayed the submission of its price proposals for these addenda, which delayed the final design changes. Respondent's PFF ¶¶ 245-57. The Board finds that Smithsonian often directed Turner to proceed with addenda before it issued funding modifications.

D. Subcontractor Performance Issues

Smithsonian contends that several problems in the performance of APRO led to the delays and increased costs of performance experienced by Turner and its subcontractors. Smithsonian highlights five instances in which APRO broke sprinkler system supply lines. Exhibit 560 at 1. Although Smithsonian established that the instances occurred, Smithsonian did not identify periods of time in which these incidents delayed the project. One of Turner's project managers testified that the sprinkler incidents did not affect the preparation of the coordination drawings, which was the critical path activity at the time. Transcript at 1244; Exhibit 5045 at 11. Turner backcharged the costs of these broken sprinkler lines to APRO, so the direct costs of these broken supply lines are not in the costs sought by Turner. *See, e.g.*, Exhibit 59 at 31.

Smithsonian also points to the difficulty APRO experienced in demolishing the concrete within the beam pockets of the structural steel. Exhibit 501. Both Turner and APRO acknowledge that APRO experienced this difficulty, Exhibit 439; Transcript at 3442-43, but assert that it arose because APRO could only use hand tools for this effort to limit the vibration, which could harm exhibits and artifacts in the museum.[13] Exhibit 3055 at 50. APRO withdrew its claim for the additional time it spent demolishing the beam pockets. Transcript at 3442-43.

Finally, Smithsonian highlights Turner's complaints about APRO's lack of adequate staffing and progress on its contracts as evidence of the difficulties APRO experienced. On July 24, 2007, Turner issued a cure notice to APRO regarding its progress on its demolition contract, Exhibit 82, but it did not terminate APRO's subcontract. The Board credits the testimony of APRO's president that APRO experienced difficulty meeting schedules on its demolition contract because of the unexpected volume of abatement required. Transcript at 3424.

E. Design and Management Issues

Smithsonian highlights several issues related to the design that it contends are Turner's responsibility pursuant to the design-build contract. The first issue was the slow

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[13] Smithsonian chose to leave exhibits and artifacts in the museum during the renovation. Because of concerns about vibration, sensors were placed throughout the museum, including one on a statue of George Washington. When the vibration caused by demolition activities became too great, the sensor would send a signal to the cell phone of Turner's superintendent. The superintendent regularly received calls from George Washington during the course of the project. Transcript at 1101-02.

processing of requests for information (RFIs) by SOM, which became part of Turner's team. Smithsonian points to complaints by Turner subcontractors M.C. Dean and Welch & Rushe about these slow responses. Respondent's PFF ¶¶ 1031-37. Smithsonian also highlights an email message that Turner's program manager sent internally about the need for additional manpower commitments by SOM to address the issues that arose because of "their incomplete design." Exhibit 951. When asked about this statement, the project manager explained that some of the issues arose because of incomplete drawings but others arose because there were "conflicts with the existing building. And there's a lots of elements out there that never showed up on any of the drawings that we had access to at the time." Transcript at 907-08.

Smithsonian also points to several items that were the subject of change orders as the result of what Smithsonian describes as design errors and omissions. Respondent's PFF ¶¶ 311-22. Turner's program manager explained that, based upon his experience with museum renovation, it is not unusual to see errors in drawings prepared by architects. Transcript at 1242. Further, Turner included contingencies in its pricing to correct such errors. *Id*. at 1243. Smithsonian's Deputy Director of OPDC, when asked what Turner's obligations were as the designer on the design-build contract, stated: "To design the project. To give us a project that met the scope of work, the intent and deliver a fully functional, usable space." *Id*. at 3640.

Finally, Smithsonian offers several findings about Turner's management of the project, highlighting correspondence regarding performance failures of individuals employed by Turner. Respondent's PFF ¶¶ 292-99. While Smithsonian asked Turner personnel about the performance of these individuals, Smithsonian did not elicit any testimony or provide other evidence that these performance issues were responsible for the delays or disruption experienced on the project.

III. Performance Problems Led to Disruption and Delay

A. Testimony About Disruption

Turner and each of the subcontractors presented testimony about the disruptive effects of these issues to their planned performance.

Turner's superintendent testified about the continuing abatement and MEP interferences that he saw when he started on the project in August 2007. Transcript at 1060, 1097. In an effort to put the project back on track, he took "an aggressive approach on schedule." *Id*. at 1076. He also released a greater number of areas for subcontractors to work on and worked to stack subcontractors. *Id*. at 1073, 1076. These efforts caused a

decrease in subcontractors' productivity and an increase in Turner's general conditions costs, as Turner was required to supervise more work. *Id*. at 1076, 1098.

Welch & Rushe experienced delays and labor inefficiencies as the result of numerous areas becoming inaccessible due to abatement work and additional work required as a result of the addenda and MEP interferences that had to be investigated. Transcript at 2434-44, 2673-88. Welch & Rushe also had to spend time investigating pipes and cables that were not on the existing building drawings and were often abandoned. *Id*. at 2410. Welch & Rushe had to develop a plan to address the interferences, which had to be approved by Smithsonian, prior to installation of the new pipes. *Id*. at 2401-03. The difficulties were compounded by Smithsonian escorts showing up late or without keys to areas to be investigated. Exhibit 4974. Welch & Rushe brought in additional crew members to investigate and plan around these interferences. Transcript at 2410. Welch & Rushe repeatedly had to start and stop its work on the coordination drawings and the installation of piping for the plumbing and electrical systems because of these problems. *Id*. at 2443-45, 2682. Welch & Rushe's superintendent testified that "sometimes you couldn't put two full lengths of pipe together." *Id*. at 2682. As a result of these problems, Welch & Rushe's plan for working on the project was disrupted. *Id*. at 2683.

Welch & Rushe witnesses also testified to delays caused by inoperable freight elevators and security requirements. There were two freight elevators on the project, which had to be operated by Smithsonian personnel and were often broken. Transcript at 2408, 2678. Welch & Rushe also experienced delays in gaining access to the work site in the morning when Smithsonian guards were late arriving to check identification. *Id*. at 2405.

Three of Welch & Rushe's subcontractors also testified as to the disruption experienced on the project. Stromberg Metal Works, Inc. (Stromberg) was Welch & Rushe's HVAC duct installer. Both Stromberg's senior project manager and executive vice president testified in support of Stromberg's claim and described the interferences as "sprinkler piping, electrical conduits and communication cabling." Transcript at 2888; Exhibit 4876 at 6-7. Stromberg's project manager testified that these interferences were not indicated on the building drawings and could not have been known until the ceilings were demolished. Transcript at 2889-90. Once these ceilings were demolished, "utilities started falling out of the air." *Id*. at 2890. Because of these interferences, Stromberg could not install the HVAC lines in the efficient manner it planned. *Id*. at 2870-71. Instead, Stromberg would install lines where possible and then return to connect the lines to larger lines when they were installed. *Id*. at 2885, 2892, 2946; Exhibit 4876 at 9, 12 (pictures of piecemeal installation of ductwork).

Southern Insulation, Inc. (Southern), Welch & Rushe's subcontractor for piping and ductwork insulation, experienced lost productivity because it could not work in the sequence it had planned. Instead, Southern was required to insulate piecemeal as piping and ductwork were installed in a patchwork pattern all over the project. Transcript at 3128-29. Similarly, Siemens Industry, Inc. (Siemens), Welch & Rushe's subcontractor for the installation of automation controls for the mechanical and security systems in the building, could not work in accordance with its original plan because it had to wait until other trades had finished their work. *Id*. at 3225-26. Siemens often had to return several times to finish a single task. *Id*. at 3231-32.

M.C. Dean, Turner's electrical subcontractor, experienced delays and loss of productivity as the result of unforeseen hazardous materials, differing site conditions, and MEP interferences. Transcript at 3291-92. Whenever M.C. Dean encountered unexpected wiring, it would have to investigate what the wiring was for and where it went. *Id*. at 3303-04. These investigations often required it to enter the parts of the museum that Smithsonian still occupied, which further delayed efforts as M.C. Dean waited for an escort into the space. *Id*. at 3302. M.C. Dean was also required to bring in additional crews to install temporary wiring to enable systems to continue to operate while they were reconfigured. *Id*. at 3341. M.C. Dean's work was complicated by these conditions so that it could not proceed in the sequence that M.C. Dean anticipated. *Id*. at 3298, 3303.

March Westin was to install structural steel on all five floors of the museum and planned to work from the top floor to the ground floor. Transcript at 1963-64. March Westin experienced delays and labor inefficiencies when it repeatedly encountered hazardous material that had to be abated or MEP interferences that had to be relocated before it could perform its work. *Id*. at 1975-90. As a result of these conditions, March Westin was required to perform work out of sequence or in a "hopscotch" manner. *Id*. at 2017. March Westin's employees were forced to move around the building seeking areas in which they could proceed with their efforts. *Id*. at 2020-21. This method of proceeding added performance time and increased its labor costs. *Id*. March Westin also experienced acceleration and trade stacking as Turner pushed everyone to complete the project. *Id*. at 2018-19. March Westin increased its crews from the planned number of two to four to finish the work. *Id*. at 2019-20.

APRO discovered material that required abatement in every area in which it was assigned demolition work, which, in turn, caused inefficiency in its demolition work. Transcript at 3410. APRO would mobilize for demolition in an area, only to be required to demobilize for abatement, and could only work in a "small piecemeal fashion," out of sequence and moving from one area to another. *Id*. at 3410-11, 3424-25. APRO could not use the building electrical shafts as trash chutes, as it had planned, because of the presence

of hazardous materials. *Id*. at 3379. Instead, APRO had to use the two elevators, which were used by all contractor personnel, at a greater cost of labor and time. *Id*. at 3425; Exhibit 41 at 900.

C.J. Coakley Company, Inc. (Coakley) was Turner's subcontractor to finish the interior spaces, installing drywall and acoustical ceilings. Coakley's work was affected by all of the problems experienced by the other subcontractors simply by the nature of its work. As Coakley's vice president testified, Coakley had to wait for the demolition to be completed before it could begin marking lines and installing framing. It then had to await the rough-ins by the other trades before it could beginning hanging drywall. Transcript at 3478. The process was similar for the ceiling work: Coakley installed the framing and then returned to install the ceilings after the other trades had finished their work. *Id*. at 3479.

B. Turner's Delay Analysis

In support of the delay and disruption claims, Turner presented a delay analysis prepared by its expert, Mr. Farooqi. Mr. Farooqi identified 133 days of critical path delay, equal to the period of time between the initial substantial completion date, June 20, 2008, and the actual substantial completion date, October 31, 2008. Transcript at 218-19. During this period, the critical path activities were the erection of structural steel, preparation of coordination drawings, abatement activities, and relocation of steam lines. Exhibit 5045; Transcript at 228-65. Earlier hazardous waste abatement, MEP interferences, and design changes caused these delays.[14] Transcript at 228, 240, 243, 338, 340.

Smithsonian provided its own delay analysis performed by Daniel Stewart of Hill International. For the most part, Mr. Stewart identified the same activities on the critical path and the same causes of delay. Mr. Stewart agreed that the structural steel work was on the critical path and found a compensable delay of twenty-six days due to hazardous material abatement. Similarly, Mr. Stewart agreed that the coordination drawings were on the critical path during the same period. Exhibit 4747 at 10-12. Mr. Stewart disagreed with Mr. Farooqi's assessment that Smithsonian was responsible for these delays. Transcript at 4423.

Mr. Farooqi did not testify or offer any opinion as to any specific periods of delay experienced by Turner's subcontractors. Similarly, none of the subcontractors' witnesses

[14] Mr. Farooqi also acknowledged that there was a concurrent delay in the beam pocket demolition work performed by APRO, a predecessor activity for installation of the structural steel, and he could not separate the two causes of delay. Transcript at 395-96.

testified as to specific periods of delay tied to Mr. Farooqi's analysis.[15] Because of this gap in proof, the Board does not need to decide whether Turner proved that it experienced critical path delay for the entire period identified by Mr. Farooqi.

IV. Turner's Claims

A. Turner's 2011 Claim for General Conditions Costs[16]

1. Nature of Turner's claim

Turner incurred $12 million in general conditions costs in performance of the project, of which approximately $10 million was for construction activities. Transcript at 1682. Patrick McGeehin, Turner's damages expert, and his firm reviewed Turner's general conditions and removed costs that were unallowable based upon guidance in the FAR. *Id.* at 1390. Smithsonian's auditor, Jeffrey DuVal of the Kenrich Group, LLC, agreed that Turner incurred these general conditions costs. *Id*. at 4979; Exhibit 236 at 37 n.69.

Turner seeks these costs as part of the reasonable price for the renovation of the museum. Turner's general conditions costs, often referred to as field overhead costs, were the direct costs of Turner's supervision in the field and include the costs of the project manager, field superintendent, and others assigned to staff the project. Transcript at 1389. These sorts of costs, which may have increased due to delays and difficulties experienced on the project, are incurred on any construction project. Having failed to obtain a firm fixed price for the contract effort, Turner seeks all of the general conditions costs incurred to perform the undefinitized contract work. *Id*. at 1805.

Smithsonian contends that Turner should not recover any additional general conditions amounts, in part because evidence in the record demonstrates that the project experienced problems with safety issues and poor management by Turner. Respondent's PFF ¶¶ 292-304. While the evidence cited in these proposed findings demonstrates that Turner had management difficulties, Smithsonian offered neither documentary evidence nor testimony

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[15] Timothy Calvey, March Westin's claim expert, in response to Mr. Stewart's report, testified that March Westin's activities were on the critical path identified by Mr. Farooqi, but he did not testify as to a specific period of delay in March Westin's activities. Transcript at 2244-45.

[16] Turner hand-delivered its claim to the contracting officer on May 24, 2011. Exhibit 41.

that these difficulties were unusual for a project of this complexity. Smithsonian also did not isolate the cost of these management difficulties.

Smithsonian also challenges Turner's entitlement based upon problems with subcontractor performance, such as the sprinkler leaks caused by APRO. However, as previously noted, the direct costs of these leaks are not in the claim. Transcript at 1744; Exhibit 59. We find that any general conditions costs that might have been associated with this problem were minimal.

Finally, Smithsonian asserts that Turner's claim includes "massive overtime amounts caused by Turner management decisions or subcontractor poor performance," but cites only one instance of Turner directing a subcontractor to work overtime. Respondent's PFF ¶ 420. Turner directed the overtime work Smithsonian highlights at no cost to Turner or Smithsonian. *Id*. The subcontractors' claims include other instances of overtime, but the Board has not included those costs in what the subcontractors or Turner may recover.

2. Compilation of Turner's Claim for General Conditions

Turner's second project manager assembled Turner's claim.[17] He compiled from Turner's accounting system all of the direct costs that Turner incurred on the project, which were tracked using different project codes, for both design and construction efforts. Transcript at 1666, 1671. The direct costs of construction totaled approximately $57 million. Exhibit 257 at 2-3.[18] Within the construction effort, the project manager identified all work that was performed for a definitized price based upon the language of contract modifications. Transcript at 1684, 1694. Using pay applications and other accounting records, he identified the costs incurred to perform the modifications. *Id*. at 1702, 1705. The project manager collected the remainder of the direct costs as "undefinitized costs," which totaled $45.4 million. *Id*. at 1715-16; Exhibit 257 at 3. Turner never defined the terms definitized or undefinitized. The Board understands that, in seeking to identify "undefinitized work," it is seeking to identify the cost of the work for which there was no definitized price.

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[17] Turner employed two construction managers on the project. The first manager was brought in at the beginning and focused upon the design aspects of the project. The second manager was brought to the project in November 2007 and managed the project through the claim period and the installation of the second steam generator. Transcript at 1657.

[18] Exhibit 257 is Turner's revised claim calculation, after adjustments were made to correct for errors identified in the audit. Transcript at 1682-83.

The project manager determined the ratio of priced to unpriced direct construction work ($12.5 million (22%) to $45.4 million (78%)). Transcript at 1393, 1670. Applying these percentages to the total construction costs, he divided the general conditions costs incurred based upon these percentages and determined that Turner incurred almost $8 million in general conditions costs associated with the direct costs of the unpriced work. Exhibit 257 at 3. The project manager added the general conditions costs and the direct costs of construction together and applied a percentage for fee (3%). *Id*. He also added amounts for insurance and bond costs that included actual costs and projected costs determined on a percentage basis to derive a total cost of unpriced construction of $56.6 million. *Id*.; Exhibit 41 at 2; Transcript at 1679.[19] He subtracted from this figure the $49.6 million that Turner had been paid and determined that Turner was owed an additional $7 million. Transcript at 1668; Exhibit 257 at 1.

Turner's cost expert, Mr. McGeehin, determined that, of the $10 million in general conditions costs incurred for the construction effort, Turner was paid approximately $6 million, leaving $4,133,521 unrecovered. Transcript at 1442; Exhibit 3607 at 77.[20]

Mr. DuVal, Smithsonian's auditor, criticized the project manager's calculation as unreliable. Exhibit 236 at 9-10. Because Turner's accounting system did not track contemporaneously the costs of priced versus unpriced work, the determination of what work was unpriced was based upon the project manager's analysis after the work was complete. Transcript at 4790, 4795.[21] Mr. DuVal reviewed Turner accounting records that identified

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[19] Turner identified the percentages for insurance (1.06%), and bond (1.624%) but did not identify the incurred amounts. Exhibits 41 at 2, 257 at 3.

[20] Mr. McGeehin also calculated a daily rate for Turner's general conditions and then spread those costs, based upon that daily rate, across the periods of delay. Transcript at 1397-98; Exhibit 3607 at 27-28. While Turner did not quantify its direct cost claims as delay claims, Mr. McGeehin performed this alternative analysis in case the Board determined that there were periods of delay that were not compensable. Transcript at 1397-98. Smithsonian incorrectly asserts that this analysis shows that Turner incurred the bulk of its general conditions costs after the date of substantial completion. Respondent's Brief at 47. It does not appear that Mr. McGeehin actually analyzed when the general conditions costs were incurred; he only calculated the general conditions costs across a time period based upon a calculated daily rate. Transcript at 1398.

[21] Mr. DuVal's criticism was also a pretense to audit all of Turner's costs incurred on the contract. Because these costs were not tracked in the accounting system, Mr. DuVal determined that he should audit the entirety of Turner's incurred costs. Exhibit 236 at 6.

several of the costs the project manager identified as associated with unpriced work as being associated with priced work. *Id*. at 4791. Because Turner allocates its general conditions costs based upon the ratio of the costs of unpriced verus priced work, Mr. DuVal explained that a larger percentage of costs in the latter category would reduce Turner's claim. *Id*. at 4794, 4965. Despite these criticisms, after auditing the entirety of Turner's incurred costs, Mr. DuVal did not identify costs that were incorrectly allocated to either priced or unpriced work. Exhibit 236.

Smithsonian, in its post-hearing brief, points to two purported errors in Turner's compilation of costs. Respondent's Brief at 34-35. Smithsonian asserts that some of the costs for the SSB exhibit were incorrectly allocated to the unpriced effort. Respondent's PFF ¶¶ 592-93. However, the program manager's analysis is supported by the underlying modifications. Exhibits 7_H, 7_J. Smithsonian also claims that the program manager's analysis does not comport with internal Turner budget documents. Respondent's PFF ¶ 599. However, as the program manager and others testified, the documents cited by Smithsonian are project budget documents, not accounting records. *See, e.g.*, Transcript at 1807.

From the $10 million in construction general conditions costs, Mr. DuVal removed all of the costs attributable to supervision, engineering, and estimating because he said they were not allowable under the Equitable Adjustment clause. Transcript at 4958. The resulting amount was roughly $5 million, which Turner has been paid. *Id*. at 4961.

Mr. DuVal also observed that this $5 million in general conditions costs represented a greater percentage of overhead recovery than Turner had agreed to for change work. Transcript at 4959. When applied to the approximately $66 million in direct construction costs, $5 million is 7.6%. *Id*. Mr. DuVal noted that Turner agreed to charge only 4% for general conditions on change work. Transcript at 4959. Finally, Mr. DuVal opined that Turner had agreed to receive general conditions costs as a percentage of direct costs. With its claim, he maintained, it was seeking actual costs. *Id*. at 4962-65. Finally, Mr. DuVal noted that the costs in the claim for general liability insurance and bond, which total $355,187, appeared to be estimates, as he was not shown any evidence that these costs were incurred. *Id*. at 4956.

3. Analysis of Undefinitized Direct Costs Underlying Turner's General Conditions Claim

To aid in the presentation of evidence, Turner's program manager prepared a pie chart that allocated the $45.4 million in costs of unpriced construction work into three categories:

base contract work ($34.4 million), change work approved by Smithsonian ($3.9 million), and pending/approximate change work ($7 million). Appellant's Demonstrative Exhibit 24. The program manager also prepared summaries of the direct costs that totaled these amounts. Exhibits 5341, 5342, 5343.[22]

a. Base contract work

The first category includes the costs of the base subcontracts Turner issued for the construction effort. Transcript at 1718; Exhibit 5342. The program manager divided the subcontracts based upon priced versus unpriced work under the base contract. Exhibit 5342.

Smithsonian challenges Turner's inclusion of several of the costs within the pool of unpriced work. Respondent's PFF ¶¶ 605-07. First, the compilation includes an SOM subcontract for $3.347 million, which is identified elsewhere as a fixed-price design contract. *Id*. ¶ 605; Exhibit 257 at 2. To adjust for this error, the Board reduces the total direct costs for construction from $58 to $54.6 million. Smithsonian identifies three other contract amounts (totaling $377,415) that it says are not part of the unpriced construction effort. These are contracts with TriPyramid ($367,480), Siemens ($3135), and Seneca Balancing ($6800). Smithsonian also challenges the inclusion of costs for a subcontractor that was terminated for default ($79,700) and the costs of the follow-on subcontractor ($118,700). Respondent's PFF ¶ 609. In addition, Smithsonian identifies $115,900 in allowances that Turner never reconciled. *Id*. ¶ 610. The Board is unable to determine from the record whether these costs are properly included in the tally of unpriced construction work. If these contracts and their corresponding costs are removed ($691,715), the amount of unpriced base contract work is reduced to $33.7 million.[23] This amount is 62% of Turner's total direct construction costs.

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[22] The Board admitted these summaries over Smithsonian's objection because Smithsonian had sought the same information in discovery and the summaries assist the Board in its determination of a reasonable price. Transcript at 1785. Because the Board uses this evidence to reduce Turner's claim and has made adjustments based upon the errors identified by Smithsonian, the Board discerns no prejudice to Smithsonian from admitting the summaries. Fed. R. Evid. 103.

[23] Smithsonian challenges other amounts included in the chart, but the Board accepts Turner's explanation in response to these challenges. Respondent's PFF ¶¶ 605-10.

b. Approved change work

The next group of costs that Turner associates with unpriced construction work is the direct costs of the change work approved by Smithsonian. Exhibit 5341. This work is included in the unpriced work because it was covered by unilateral modifications. Transcript at 1910. Although these change orders were not issued through bilateral modifications, the prices for the changes were negotiated between Turner and Smithsonian. *Id*. at 1659-60. For each of these pieces of change work, the record includes Smithsonian's request for a proposal and Turner's proposals from its subcontractors, to which Turner added general conditions costs and fees. *See, e.g*., Exhibit 7_X at 1156-57. The program manager removed the general conditions and fee amounts when he tallied the cost of the change work. *Compare* Exhibit 7_X at 1161 *with* Exhibit 5341 at 5 (only subcontractor proposed cost included); Transcript at 1723, 1796-98.

c. Pending change work

The final group of costs that Turner associates with unpriced work consists of additional work that was undertaken but either not presented to Smithsonian as a change request or rejected by Smithsonian, prior to the submission of Turner's 2011 claim. Transcript at 1723-24. Turner included the costs of this "pending change work" in its claim because they were incurred in performance of the project and include costs for inspections and testing, MEP interferences, overtime, design development, ceiling work, and additional scope. *Id*. at 1727; Exhibit 5343. Turner's project manager testified that these amounts do not include the $6 million in subcontractor claims, Transcript at 1730, but the Board can match some of the subcontractors' claims for additional work to figures listed in this summary. Exhibit 5343. No one explained why the bulk of these additional costs was not presented as change order requests to Smithsonian.

Turner did not submit all of the proposed change orders that underlie these requests for the record, although it did present this documentation to Smithsonian in support of its claim. Transcript at 1724; Respondent's PFF ¶ 625. Examining change orders in the record, the Board found discrepancies. For example, Turner submitted a change order request for subcontractor overtime (COR 223), but the amount of the request does not match the amount in Turner's compilation. *Compare* Exhibit 3532 at 3 *with* Exhibit 5343 at 4.

B. Turner's 2015 Claim for Second Steam Generator[24]

As part of its scope of work, Turner was required to upgrade the mechanical system for the renovated portion of the museum. Exhibit 5_E at 209. This system was required to maintain humidity levels at 50%, plus or minus 5% during the heating season. Appellant's PFF ¶ 457; Respondent's PFF ¶¶ 928-29.[25] In the 95% drawings, and the specifications that accompanied them, Turner proposed to install a system that would meet this requirement. Respondent's PFF ¶ 930. This system included only one steam generator to service four air handling units that were installed as part of the renovation. Transcript at 3979-80. Smithsonian asserts that Turner's proposed system was definitized with the submission of these drawings. Respondent's PPF ¶ 933.

The parties agree that the HVAC system did not maintain the required humidity levels beginning with the first heating season after substantial completion. Transcript at 1736-37. To determine why, the parties agreed that Turner would hire AECOM to conduct an investigation. *Id*. at 1737.

The AECOM engineer responsible for investigating the problem testified that, although the steam generator installed by Turner had sufficient capacity to meet the humidity requirements, it did not have a "safety factor built in for unforeseen conditions." Transcript at 994. Such a condition would be the steam provided to the museum by the General Services Administration (GSA) steam plant. According to the engineer, the GSA steam "does not have the best reputation as far as being reliable. The pressure can fluctuate. The condition of the steam itself being clean or dirty can inhibit the steam generator's ability to produce steam at its rated capacity." *Id*. The inconsistency of the GSA steam coupled with several other factors in the equipment design and layout kept the HVAC system from maintaining the required humidity levels. *Id*. at 998-99. The AECOM engineer testified further that Smithsonian had made modifications to the control systems and had chosen to override the system to try to get the system to perform as required; however, he also acknowledged that AECOM was able to get a baseline measurement with the system operating as intended. *Id*. at 1000. Finally, AECOM's report noted that exterior doors should not be propped open, but the AECOM engineer acknowledged that AECOM's testing occurred before the museum opened to the public in the morning. *Id*. at 1035. AECOM

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[24] The contracting officer received Turner's claim on May 6, 2015. Exhibit 309.

[25] The contract also required Turner to warrant and guarantee that "mechanical [] equipment shall be fit and fully useable for its intended and specified purpose and shall operate satisfactorily with ordinary care." Exhibit 1_F at 211 (Clause 72(a)(5)).

recommended several changes to the existing system to address the problems, but did not recommend the installation of a second steam generator. Exhibit 309 at 21.

After the issuance of AECOM's report, believing that none of the recommended fixes would address the issue, Smithsonian directed Turner to install the second steam generator. Transcript at 1742. Smithsonian noted in its direction to proceed that Turner was responsible for all of the costs of the work because the contract was a design-build contract and "Turner is entirely responsible for the success of its own design and installation." Exhibit 302. Smithsonian accepted the second steam generator after the system was shown to meet the required humidity levels in November 2014. Respondent's PFF ¶¶ 951-52.

Turner submitted a claim in the amount of $438,668. Exhibit 309 at 4. That amount includes the $400,000 in direct costs paid to Welch & Rushe and markups for commission, insurance, and bonding. *Id*. at 4, 140. Turner did not include costs for any design work associated with the additional installation. *Id*. at 4. Smithsonian offered no evidence that Turner's actual cost to install the second steam generator was unreasonable or in excess of what Turner would have incurred if it had installed a second steam generator originally. *See generally* Respondent's PFF ¶¶ 926-62.

Turner also seeks $424,698 for an "unpaid approved contract balance." Appellant's Response Brief at 51; Appellant's PFF ¶ 456. Smithsonian's proposed findings are silent as to whether this amount is owed to Turner. Respondent's Response to Appellant's PFF ¶ 456; Respondent's PFF ¶ 581. We expect that any outstanding balance due and owing will be paid.

V. Subcontractor Claims for Labor Inefficiency, Extended Overhead, and Change Work

A. Change Order Releases

Smithsonian asserts that the subcontractors' claims have been released through the execution of change orders or lien releases during performance of the contract.[26] APRO, Coakley, and March Westin signed change orders with Turner that added or deducted individual items of work from their respective subcontracts. Exhibits 59, 76, 103. With the exception of the change orders for the payment of overtime to Coakley discussed below, none of these change orders appear to address claims for delay or disruption caused by MEP

[26] The contracting officer did not mention these releases in either of her decisions rejecting the subcontractors' claims, Exhibits 42, 237, but Smithsonian did assert the affirmative defense of release in its answer to Turner's complaint in the second appeal, filed October 24, 2014.

interferences or hazardous material abatement. All of the change orders contain the following release:

> Through acceptance of this Change Order, this Subcontractor acknowledges that it has reviewed the progress of the Work related to this Project and the potential time impact of the added [or deleted] work on the progress of the project in the future. As a result, this Change Order includes compensation to the Subcontractor for any and all effects, delays, inefficiencies or similar demands associated with this Project and the Subcontractor recognizes that there is no basis for any such claim in the future.

See, e.g., Exhibit 103 at 1.

B. Lien Releases

1. Language of the Lien Releases

Coakley, Welch & Rushe, M.C. Dean, and March Westin executed documents titled, "Affidavit, Partial Waiver of Lien and Release," in exchange for progress payments on the project. Exhibits 394, 395, 3197, 3711. These affidavits all contain the following language:

> The undersigned has received payment in full for all deliveries of material to and/or for all work performed in connection with the construction of the project through the date of the [Turner] Application for payment No. [xx] for the period ending [date] and hereby **represents and warrants** that there are **no outstanding claims** by the Company in connection with the project through the date of Application for Payment No. [xx] except for any retention, pending modifications and changes, or disputed claims for extra work as stated herein:
>
> In consideration of the above-mentioned payment in full, the undersigned does hereby **waive, release and quit claim** in favor of the development manager, owner of the project, each and every party acquiring title to and/or making a loan on the project, the title company or companies examining and/or insuring title to the project, any surety or guarantor, the general contractor, Turner Construction Company and other party having an interest in the project and any and all of their successors and assigns (hereinafter collectively referred to as the "Released Entities"), all rights that presently exist or hereafter may accrue to the undersigned to assert a lien upon the land and improvements comprising the project by virtue of any law regarding the rights of a contractor, subcontractor, laborer, supplier, or materialman to assert a lien or claim against

> the project for deliveries of material to and/or work performed in connection with the construction of the project through the date of Application for Payment No. [xx], except for those items listed under No. 1 above.
>
> . . . .
>
> The undersigned does hereby forever release, waive, and discharge the Released Entities from any and all causes of action, suits, debts, accounts, damages, encumbrances, judgments, claims and demands whatsoever, in law or equity or otherwise, and whether known or unknown and whether presently ascertainable or not, which the undersigned and/or its successors and/or its assignees ever had, now have, or ever will have against the Release Entities, by reason of **delivery of material and/or performance of work relating to the project through Application for Payment** No. [XX], except for those items listed under No. 1 above.

See, e.g., Exhibit 395 at 2. Turner's contract with Smithsonian required that Turner obtain lien releases prior to requesting progress payments from Smithsonian. Exhibit 1_F at 297-98.

2. Evidence of Continuing Consideration of Claims

Welsh & Rushe noted on several of the lien releases that it had attached a change order reconciliation log. *See, e.g.*, Exhibit 395 at 2. Welsh & Rushe also notified Turner of the effect the problems with MEP interferences and hazardous material abatement were having on its work on the project. *See, e.g.*, Exhibit 4930.

M.C. Dean did not note any reservations on the lien releases, Exhibit 3197, but did note that it reserved its rights on change orders that it executed. *See, e.g.*, Exhibit 128. M.C. Dean also notified Turner of the effect that the problems with MEP interferences and unanswered requests for information were having on its work on the project. *See, e.g.*, Exhibit 882.

March Westin noted its reservation of its delay claim in its September 1, 2009, lien release, Exhibit 3711 at 1, and noted in correspondence with Turner its claim for extended general conditions costs due to delays. *See, e.g.*, Exhibit 909 at 2.

Coakley did not note any reservations, Exhibit 394, but contemporaneously notified Turner of its inability to make progress due to "hold ups and coordination issues." Exhibit 711.

C. Elements of Individual Subcontractor Claims

Turner presented pass-though claims for five of its subcontractors. The subcontractors assert three different types of claims: lost labor efficiency due to disruption, extended overhead due to delay, and uncompensated change work. March Westin also seeks extended home office overhead costs and retainage.

1. Welch & Rushe

Welch & Rushe seeks $1,672,432.71: $815,675 for labor inefficiency costs, $123,245.71 for extended overhead costs, and $733,512 for pending change work. Exhibit 41 at 679.

Labor inefficiency costs. Because the disruptive impacts were constant and pervasive, Welch & Rushe could not identify a portion of its work that was not affected by these factors for the purposes of performing a measured mile analysis. Transcript at 2441-42. Welch & Rushe's expert, Paul Stynchcomb, testified that, because Welch & Rushe worked with different materials and different sizes of pipes, identifying a "measured mile" analysis would have been difficult. *Id*. at 3008.

Instead, Welch & Rushe relied on the Mechanical Contractors Association of America, Inc. (MCAA) factors to quantify its labor inefficiency claim. Mr. Stynchcomb recommended, and Welsh & Rushe applied, four MCAA factors: reassignment of manpower, concurrent operation, dilution of supervision, and site access. Exhibit 41 at 672; Transcript at 2568-69. Welch & Rushe's superintendent explained how each of these factors was appropriate, given the difficulties that Welch & Rushe experienced on the project. Transcript at 2687-703. Based upon the severity of these factors, Welch & Rushe calculated a 42% loss of productivity on a portion of its total labor costs. *Id*. at 2568-69.

Welch & Rushe made several adjustments to its labor hours prior to the application of the MCAA factors. First, Welch & Rushe bid the project with a MCAA labor factor of 0.65, which it uses for all of its Washington, D.C., area projects. Transcript at 2560-61; Exhibit 41 at 669, 676. Despite this fact, Welch & Rushe adjusted its labor factor up to 1.0, which increased its labor estimate from 8832 hours to 15,791 hours—a difference of 6959 hours, for which Welch & Rushe does not claim inefficiency costs. Transcript at 2560-65; Exhibit 41 at 670. Second, Welch & Rushe tallied its actual labor hours based on certified payroll records and excluded supervision costs. Transcript at 2569-70; Exhibit 41 at 772-815. It reduced its actual labor hours by 25% to account for any inefficiencies Welch & Rushe may have caused. Based upon these adjustments, its labor hours were reduced from 46,542 to 34,907. Transcript at 2569; Exhibit 41 at 672-73.

Welch & Rushe multiplied the 42% loss factor by the adjusted actual labor hours and then subtracted the efficient hours from the resulting amount to derive a total of 10,325 inefficient hours. Exhibit 41 at 673. Welch & Rushe multiplied this figure by its contractually agreed upon unit rate for journeyman laborers of $79 per hour, resulting in a claim for $815,675. Transcript at 3090; Exhibit 5059 at 174.

Smithsonian criticizes Welch & Rushe's choice of MCAA factors, asserting that the problems that Welch & Rushe experienced were tied to the resolution of requests for information (RFI), without determining who was responsible for the delays. Transcript at 3050-51. However, Mr. Stynchcomb testified that Welch & Rushe identified the relevant MCAA factors based upon a myriad of issues, including "addressing the RFIs, the absence of work spaces, and the movement of job crews, which could also be affected by the elevator, by security, and by other issues beyond just RFIs … [and] unforeseen issues." *Id*. at 3051-52. Smithsonian asserts further that, by applying a factor for site access, Welch & Rushe seeks to recover for site access restraints that Welch & Rushe was aware of at the time of bidding. The site access constraints, however, went beyond what was expected based upon the solicitation's warning of "normal site access requirements." *Id*. at 2405-06, 2702.

Smithsonian contends that recovery on the claim would result in a windfall to Welch & Rushe because evidence in the record suggests that Welch & Rushe's estimate for the project was 34,314 labor hours but there were 25,677 labor hours in the original bid. Exhibit 1451. However, the hours set forth in Exhibit 1451 match the hours in Welch & Rushe's claim for total hours expended on the project. *Compare* Exhibit 1451 at 2 *with* Exhibit 41 at 771. Smithsonian also proffers Welch & Rushe's October 19, 2009, request for equitable adjustment (REA) that asserts that Welch & Rushe's bid was based upon 18,340 hours, but Welch & Rushe explains that the reference in the REA was to all hours, not only craft hours, as in its 2011 claim. *Compare* Exhibit 1441 at 7 *with* Exhibit 41 at 677. Smithsonian notes that Welch & Rushe did not provide proof of its bid estimate, instead relying upon the testimony of its superintendent and director of operations that Welch & Rushe's bid applied an MCAA factor of 0.65, which was adjusted upward. Exhibit 1451; Transcript at 2623-24. The Board credits this testimony of the Welch & Rushe witnesses regarding the company's standard practice for contracts in the Washington, D.C., area. Transcript at 2561.

Smithsonian correctly notes that Welch & Rushe did not remove hours for approved or pending change work from its labor hour total. Respondent's PFF ¶ 1342; Exhibit 41 at 677. Although Welch & Rushe reduced its total labor hours by 25% prior to calculating the number of inefficient hours to account for inefficient hours that may have been Welch & Rushe's responsibility, this reduction does not address whether Welch & Rushe has been paid already for some of these inefficient hours. If the hours attributable to approved and pending

change orders are removed (12,605), the total labor hours drops to 33,937.[27] Applying the 42% inefficiency factor, the inefficient hours are 7528.28. When this number is multiplied by the hourly rate of $79, Welch & Rushe's claim for loss of productivity is reduced to $594,734.

Extended overhead costs. Welch & Rushe calculated a daily overhead rate of $1987.09 for supervision and job site costs. Exhibit 41 at 816. It multiplied this rate by 205 days, the number of days between Welch & Rushe's subcontract completion date and its actual completion date. From the resulting figure, Welch & Rushe removed the overhead costs sought on approved and pending change orders, resulting in a claim of $123,245.71. Exhibit 41 at 816.

Pending changes. Welch & Rushe seeks $733,512 for seventy-two unpaid change orders. Exhibit 5094 at 12-15 (list of change orders). Copies of most, but not all, of these change orders appear to be in the record. Welch & Rushe's director of operations testified that the amounts presented were negotiated by Welch & Rushe and Turner. Transcript at 2604. The director was asked about three specific items of change work. *Id*. at 2593-2607. For two changes, he could not provide details about why the work was necessary. Exhibits 744, 919. He recalled the details regarding the third change, but did not explain why the change was Smithsonian's responsibility. Exhibit 1404; Transcript at 2595-98. Instead, the director of operations only testified that "[w]e were having a lot of problems with steam on the project, and one of the biggest things was the humidity level in that building and how the humidifiers were operating." Transcript at 2595.[28] The proposed change orders themselves do not provide sufficient detail for the Board to determine why the work was undertaken, and Welch & Rushe provided no further explanation in post-hearing briefing.

The Board finds that many of the change orders include invoices or quotes from Welch & Rushe's subcontractors, Stromberg, Southern Insulation, and Siemens. *See, e.g.*, Exhibits 805 at 3, 983 at 3. It also appears that Stromberg seeks recovery of the same amounts in its change orders. *Compare* Exhibits 471 at 3 *with* 4890 at 66. Welch & Rushe provided no method by which the Board can deduct the amounts sought by Stromberg to ensure that there is no double recovery. Siemens has calculated its claim as a total cost claim

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[27] Total labor hours expended (46,542) - labor hours for approved and pending change orders (9088 + 3517) = labor hours subject to productivity factors (33,937).

[28] Based upon this testimony, the Board could surmise that this change work was undertaken to address the humidity levels in the museum, work that is also the subject of Turner's 2015 claim to the contracting officer. The Board is unwilling to do so without a better explanation from Welch & Rushe or Turner.

and the Board has no way to determine whether these pending change order costs are included in Siemens's total cost claim. Southern Insulation, on the other hand, removed the costs of both its approved change orders and its pending change work from its claim. Exhibit 41 at 722.

Welch & Rushe also passed through the claims of its three subcontractors, Stromberg, Southern Insulation and Siemens.

2. Stromberg

Stromberg seeks $1,318,348.79: $1,011,243.58 for labor inefficiency costs, $71,702 for extended overhead costs, and $235,425 for unpaid changes. Exhibit 5334; Transcript at 2817.

Labor inefficiency costs. Stromberg performed a measured mile analysis to support its labor inefficiency claim. For its measured mile, Stromberg used its work in level two south, an area not affected by unknown MEP interferences. Transcript at 2898, 2929. In this area, Stromberg installed 9500 pounds of HVAC ductwork trunk lines and branch lines in an efficient manner. Exhibit 4879. Stromberg determined it took 807 labor hours, excluding supervision, to install this ductwork, based on its detailed job cost report. Exhibit 4878 at 94-98; Transcript at 2930-31. Stromberg computed the field labor production rate in this area to be 11.77 pounds per labor hour. Transcript at 2931.

During the project, Stromberg installed a total of 228,212 pounds of ductwork, from which it deducted ductwork installed pursuant to both approved and unapproved change orders (25,882 pounds) and ductwork it installed in the section used as the measured mile in level two south (9500 pounds), which left a total of 192,830 pounds. Transcript at 2919, 2927-29; Exhibit 41 at 718. Based upon its field labor production rate, Stromberg calculated that it should have spent 16,380 hours to install the ductwork on the project. Transcript at 2938. Instead, Stromberg spent a total of 34,985 hours (excluding level two south) to complete its work on the project. *Id*. at 2939. Stromberg claims the difference, 18,605 hours, as the measure of its labor inefficiency. *Id*.

Stromberg multiplied this hours figure by its average burdened hourly field labor rate of $43.61 to derive a labor inefficiency cost of $811,364.05. Transcript at 2941; Exhibit 41 at 719.[29] To this figure, Stromberg added 18.7% overhead and 5% profit, to arrive at a total claim of $1,011,243.58. Transcript at 2944-45.

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[29] In Stromberg's claim, two digits are transposed ($811,346.56). Exhibit 41 at 719.

Smithsonian asserts that Stromberg chose as its baseline "non-contiguous sections of work." Respondent's PFF ¶ 1361. This assertion is not supported by the testimony cited. Transcript at 2929, 2962, 3074-75. Moreover, the fact that the baseline was not all of level two does not affect the quality of the baseline. As Stromberg's executive vice president testified, Stromberg could not use all of level two because there were too many interferences in some places. *Id*. at 2961, 3074-75.

Extended overhead costs. Stromberg calculates a delay of 109 work days between its planned substantial completion date and the date it substantially completed its work. Transcript at 2951-52; Exhibit 5334 at 4. Stromberg calculated a daily rate $813.13 for its general conditions costs, but inexplicably converted this rate to a "workday" rate, even though the components of its daily rate already reflected work day charges. Exhibit 41 at 719; Exhibit 5334 at 4. After multiplying Stromberg's daily rate times 109 days and subtracting the overhead costs on change orders ($52,380.55), Stromberg's claim for extended overhead is $36,250.62. Exhibit 5334 at 4.

Pending changes. Stromberg also seeks to recover for unpaid changes totaling $235,425. Exhibit 5334. Three of these change orders are for overtime premium pay incurred by Stromberg between July and October 2008, in a total amount of $106,641. Transcript at 2825. Stromberg incurred these costs after Smithsonian established the new substantial completion date of October 31, 2008. Transcript at 2823; Exhibit 7_Z. Stromberg's senior project manager testified, "To help with all the delays in the project that were taking place . . . the only way we could even hope to achieve the October 31st date was to start working on our work forces, ten hour days, six to seven days a week." Transcript at 2823.

Smithsonian asserts that Turner directed Stromberg to work overtime because Stromberg had not completed its work. Respondent's PFF ¶ 762 (citing Exhibit 1284 at 54). Turner noted in this direction, issued on August 29, 2008, that Stromberg could work the overtime under protest and track its hours for submission as a change. *Id*.

Stromberg's senior project manager testified in detail about ten other unpaid change orders, explaining that the additional work was needed either because of changed requirements or for issues that were not known until the ceilings were removed. Transcript at 2832-62; Exhibit 5334. For example, one change was necessary to provide additional air supply to the SSB chamber after it was discovered that the unique fire suppression system chosen by Smithsonian was generating too much heat. Transcript at 2854-55. With regard to the remaining changes, totaling approximately $30,000, the senior project manager explained that they all arose from issues or items that were not indicated on the 95% drawings. *Id*. at 2863. Stromberg included in the record its change order proposals for all

of this work, Exhibit 4890 at 66-122, and the senior project manager testified as to the pricing of these proposals. Transcript at 2836-37. The change orders include overhead of 10% and profit of 5%. Exhibit 4890 at 66-122. The total cost of the change work excluding the overtime costs is $128,784.

Smithsonian's only response to Stromberg's evidence is that Stromberg, like all of Turner's subcontractors, has failed to prove that the work is a proper charge under the contract and that the amounts sought are reasonable and allowable. Respondent's PFF ¶ 725.

3. Southern Insulation

Southern seeks $218,489 for costs incurred due to lost productivity. Exhibit 41 at 722; Transcript at 3122-23.

Southern used the modified total cost method because of the nature of its productivity losses and its work being all over the museum. Transcript at 3133. There was not a segment of work upon which Southern could have determined a measured mile. *Id*. at 3134. Southern's actual costs totaled $692,082. It reduced this amount to $490,697 after removing amounts for errors in labor burdens, budgeted costs for approved change orders and pending change orders. Exhibit 41 at 722; Transcript at 3134-40. Southern's president testified as to how Southern developed its original bid estimate of $299,958 and determined that it had underestimated the cost of scissor lifts by $16,505 when it bid the job. Transcript at 3135-39. [30] Southern subtracted this revised bid estimate ($316,463) from its reduced actual costs to derive $174,234, the difference in its total costs. To this figure, it applied an overhead percentage rate of 14% and 10% profit to derive a total claim of $218,489. *Id*. at 3141-42. While Southern's president testified as to Southern's extensive experience on government projects and museums, *id*. at 3123-24, he did not testify as to any analysis that was performed to determine that the additional costs incurred were caused solely by issues for which Smithsonian was responsible. *Id*. at 3122-66.

Smithsonian asserts that Southern's bid estimate does not provide information regarding its hourly rate, but this contention is refuted by both the testimony cited and the bid estimate itself. Exhibit 41 at 725, 732; Transcript at 3145-46. Smithsonian also asserts that Southern's markups for overhead and profit contravene the terms of Welch & Rushe's contract with Turner. Respondent's PFF ¶ 1392. However, the cited provision addresses markups for change orders, but not base contract work. Exhibit 3050 at 59.

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[30] Southern planned upon using scaffolding to perform its work. Transcript at 3140. As the president of Southern and other witnesses explained, it was impossible to use scaffolding on the job because of the pervasive hazardous material abatement. *Id*.

4. Siemens

Siemens seeks $203,161.60 in costs it incurred on the project due to delays, unforeseen conditions, and lost productivity. Transcript at 3226-27; Exhibit 41 at 734.

Siemens calculated its claim by the total cost method. Transcript at 3229-30. Siemens calculated the difference between its actual and planned hours for the project for its three different skills. *Id*. at 3230-31. Siemens then removed hours for previously settled changes. *Id*. at 3231. There is no indication that Siemens removed the hours that may be included in the pending Welch & Rushe changes. Siemens then multiplied those hours by its burdened labor hour rate for a total of $116,477.46. Exhibit 41 at 735. Siemens then added labor costs of $11,509.34 from its subcontractor, Metropolitan Electric, and applied its audited corporate overhead rate of 44.32% and profit of 10% to derive its claim of $203,181.60. Exhibit 41 at 735; Transcript at 3234, 3437.

Siemens's operations manager, the only witness to testify in support of Siemens's claim, could not testify as to any details about the reasonableness of Siemens's bid because he did not prepare it and had not reviewed it in preparation for his testimony. Transcript at 3226, 3244. The operations manager also provided no information regarding the costs included in Metropolitan's claim, other than to note he had removed costs paid through approved changes. *Id*. at 3236.

5. M.C. Dean

M.C. Dean seeks $1,374,658: $808,572 for lost productivity, $433,474 for extended overhead, and $132,612 for pending changes. Exhibit 41 at 823-27; Transcript at 3336-45.

Loss of productivity. M.C. Dean seeks the costs attributable to its loss of productivity and acceleration during the last thirteen weeks of the project when M.C. Dean saw the effects of the disruptions in the coordination work in the percentages of total hours worked and overtime hours incurred, as compared to the remainder of the project. Transcript at 3337-38. M.C. Dean incurred costs for 35,783 hours during this thirteen-week period. Exhibit 41 at 823. Looking at industry manuals for calculating productivity losses, M.C. Dean determined that its productivity loss was 34%. Transcript at 3339. M.C. Dean multiplied the number of hours worked during the last thirteen weeks of the project by that percentage to determine that its lost productivity resulted in 12,166 additional hours. It multiplied this figure by its average hourly rate of $44.07, to derive a lost productivity cost of $536,165.32. Id. at 3340; Exhibit 41 at 823. To this figure, M.C. Dean applied 15% markup for supervision ($80,424.80) and added its overtime premium costs for the period of $191,982.84, resulting in a total claim for $808,572.95. Exhibit 41 at 823.

Smithsonian asserts that M.C. Dean's claims for loss of productivity and premium overtime are "overlapping." Respondent's PFF ¶ 1582. M.C. Dean explains that the claims are not overlapping because M.C. Dean seeks only the overtime premium for those hours. Appellant's Response to Respondent's PFF ¶ 1582. Smithsonian also contends that M.C. Dean failed to explain sufficiently its 34% lost productivity factor based upon curves found in industry publications. Respondent's PFF ¶ 1583. As discussed below, we adopt Smithsonian's objections regarding this lack of proper support.

Extended overhead costs. M.C. Dean also seeks the costs of extended general conditions for a period of delay of 154 days, the difference between M.C. Dean's actual completion and its planned completion dates. Exhibit 41 at 822. M.C. Dean determined that its daily general conditions rate was $2814.77, for the field office, indirect labor, field labor, and equipment it required on-site. *Id*. It, therefore, seeks $433,474, for extended overhead.

Pending changes. M.C. Dean also seeks the costs of three items of change work. The first change was attributable to the "inefficient and poor performance" of a contractor that Smithsonian required for the security system. M.C. Dean PFF ¶ 16. M.C. Dean seeks $37,668 for the labor and materials costs associated with these inefficiencies, but provided no explanation as to how this amount was calculated and no supporting documentation. Exhibit 41 at 823; Transcript at 3343-44.

The second change was to "program the controls for the Creston light projection system that illuminates the SSB exhibit." M.C. Dean PFF ¶ 17 (citing Exhibit 1279). The Board does not find support for the $8416 that M.C. Dean seeks for this item. Exhibit 1279 includes a Smithsonian memorandum approving the cost for controls for the SSB projectors in the amount of $2811 and M.C. Dean's quote for the work in the amount of $2562.59. Exhibit 1279 at 2, 9.

The third change was for the "purchase and installation of a new public address system to integrate with the new fire alarm and audio visual system." M.C. Dean PFF ¶ 17 (citing Exhibit 1197). The cited document describes the requirement to install new speakers and includes M.C. Dean's claimed amount for the work, $86,528. Exhibit 1197 at 1, 6. M.C. Dean's group manager described the system as the "existing public address system" and stated his belief that the change order request came from Smithsonian. Transcript at 3330. Smithsonian contends that the work was within the original scope of the project, which required, in part, that "the existing fire alarm speaker system [remain] operational" and that

it properly denied the change request on this basis. Respondent's PFF ¶ 768 (citing Exhibit 1180 at 4).[31]

6. March Westin

March Westin seeks $1,539,142.71: $909,346.86 for inefficiency, $364,457.41 for extended overhead, $155,100.44 for extended home office overhead, $82,007 for outstanding change orders, and $28,231 for earned retainage. Exhibits 41 at 831, 840-48, 3702 at 136, 3714.

Labor inefficiency costs. Mr. Calvey performed a measured mile analysis to calculate March Westin's labor inefficiency claim. As the baseline, Mr. Calvey used March Westin's work prior to September 17, 2007, because its labor productivity was "less impacted" during this period. Transcript at 2228; Exhibit 5217 at 19. By comparing pay applications for the measured mile to those for the remainder of the project, Mr. Calvey calculated that March Westin accumulated 12,616 inefficient labor hours. Transcript at 2230. Mr. Calvey calculated an average burdened hourly field labor rate of $72.08, which includes 10% overhead and 5% profit. *Id*. at 2233-34; Exhibit 3675. He multiplied the hourly rate by the additional labor hours to determine March Westin's labor inefficiency costs. Transcript at 2232. The Board calculates this amount to be $909,361.28 (12,616 x $72.08).

Smithsonian criticizes Mr. Calvey's selection of the measured mile, asserting that March Westin had not begun steel installation work by September 2007. Respondent's PFF ¶ 1515. Mr. Calvey testified that he isolated the erection field labor in performing his analysis. Transcript at 2224-28. March Westin's project manager also testified that March Westin did perform erection work prior to September 17, 2007, although the bulk of the work was after that point. *Id*. at 2148. Smithsonian also questions why Mr. Calvey calculated a labor rate different from the contractual rate of $47.49. Respondent's PFF ¶ 1508. However, the latter rate appears to be for a laborer, not an iron worker. Exhibit 45 at 46. As Mr. Calvey testified, the labor rate was an average of rates paid by March Westin and its subcontractors. Exhibit 3675.

Extended general conditions costs. Although March Westin estimated that it would require 164 days to complete its work, it required 460 days, a difference of 296 days. Transcript at 1989. March Westin provided its daily reports and testimony about examples of delays it experienced. Transcript at 1998-2000; Exhibit 3719 at 14, 17. Mr. Calvey also prepared an analysis of the periods of delay on each floor, but explained that the work was

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[31] This change order request with the amount sought by Turner is on the list of "pending change orders." Exhibit 5343 at 8.

"intermittent and non-sequential, inefficient and required multiple mobilizations." Exhibit 5217 at 13.

Mr. Calvey calculated field supervision costs by determining the average supervision manhours by day (5.3) and multiplying by the number of days of delay (296) to determine that March Westin expended an additional 1571 supervision manhours. Exhibit 5217 at 22.[32] He multiplied this number of manhours by the supervisor's hourly rate to derive a total added salary cost of $108,251.95. Transcript at 2236. Similarly, Mr. Calvey calculated an average per day for field costs ($168.19) and multiplied this figure by the number of days of delay (296) to determine that March Westin incurred an additional $49,784 in field expenses. To this figure, Mr. Calvey applied 10% profit to derive a total of $54,763.02. Transcript at 2237. He used the same method to determine the additional cost of equipment and scaffolding of $201,442.44. *Id*. at 2238; Exhibit 5217 at 23.

Extended home office overhead. Mr. Calvey also calculated an extended home office cost attributable to the additional days of work on the contract. However, March Westin's project manager testified that March Westin had other contracts during the pendency of the Smithsonian project, so many that it had to use subcontract labor to finish the museum project. Transcript at 1985-86.

Outstanding changes. March Westin also seeks payment on four pending changes. These change orders were included in the claim passed through to Smithsonian. Exhibit 41 at 849-96. March Westin's project manager explained that the change work was required as the result of design changes or to provide additional structural reinforcement. Transcript at 2042-49. Based upon the Board's review of this supporting documentation, Exhibit 3714, it appears that March Westin seeks only the direct costs of these changes. *Id*.

Smithsonian challenges the claim as to two of these change orders, suggesting that both were the result of design failures by Turner. The first, Smithsonian asserts, was the result of a "design coordination error." Respondent's PFF ¶ 771. Although the issue was the subject of an RFI, the Board finds no support for the contention that the change was the result of a coordination error. Exhibits 1156, 1157. Instead, the additional work was needed reroute the ductwork through the structural steel. Transcript at 2047. The second change was necessary after Turner's structural engineer determined the need for additional reinforcement in the SSB chamber in response to an RFI. Respondent's PFF ¶ 772. Nothing in the documentation indicates that the work was necessary as the result of a design failure.

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[32] This calculation appears to contain an error (296*5.3=1569).

Retainage. March Westin also seeks the earned retainage withheld by Turner. Exhibit 41 at 831; Exhibit 3702 at 136; Transcript at 2063. Mr. Quick testified that the amount is already reflected in Turner's costs, so it was removed from the tally of the subcontractors' claims. Transcript at 1673. Smithsonian offered no evidence that this amount was paid or is not owed to March Westin.

7. APRO

APRO seeks $651,272: $465,825 for labor inefficiency and $185,447 for extended overhead. Exhibit 41 at 899-08.

Labor inefficiency costs. To calculate its inefficiency claim, APRO used a measured mile analysis. Exhibit 41 at 901-08. APRO used the month of October 2006 as its measured mile because it worked efficiently performing demolition during this month before it first found hazardous material in November 2006. Transcript at 3427-28. During October 2006, APRO expended 856 labor hours to dispose of twelve dumpster loads of debris. *Id*. at 3428. APRO calculated that its production rate was seventy-one labor hours per dumpster load, which closely tracked its estimate of sixty-nine hours per dumpster load. *Id*.

APRO filled a total of 440 dumpster loads of debris during the project, but adjusted this figure to 375 loads to remove change order work and the disputed beam pocket work. Exhibit 41 at 908; Transcript at 3429. APRO multiplied 375 dumpster loads by its average production rate of seventy-one hours to determine that it should have spent a total of 26,625 labor hours in performing the demolition work. Transcript at 3430.

APRO expended 58,720 labor hours for the demolition work during the period of labor inefficiency, but adjusted this amount down to 50,318, again to remove hours related to the disputed beam pocket work and change work. Transcript at 3429. APRO also subtracted 856 labor hours in October and 1660 labor hours as a reasonable estimate of inefficient labor hours for which APRO may have been responsible. *Id*. at 3431. Finally, APRO subtracted the hours it should have spent performing the work (26,625) to derive a total of 21,177 inefficient labor hours. *Id*. at 3432. APRO multiplied the total inefficient labor hours by $19.05, an average burdened labor rate for demolition labor, then added 10% overhead and 5% profit. *Id*. at 3432-33; Exhibit 41 at 901.[33]

Smithsonian challenges APRO's selection of October 2006 as its measured mile because APRO has not established that the work during the first month of demolition was the same as work done later. Respondent's PFF ¶ 1245. APRO's president acknowledged

[33] APRO's calculation contains an error: 21,177 * $19.05=$403,421.85.

that the demolition activities on each floor had different scopes of work and different manpower requirements. Transcript at 3450-51.

Extended overhead costs. APRO also seeks delay costs for the additional 6.75 months it spent on the project beyond its planned completion date of April 2007. Exhibit 41 at 901. During this period, APRO incurred additional costs for project supervision, additional equipment rental costs, and additional scaffolding rental costs. *Id*. at 901, 903; Transcript at 3435. APRO withdrew its claim for the disputed beam pocket work that included the same types of costs (supervision and equipment costs). Exhibit 41 at 911-12; Transcript at 3442-43. The Board cannot tell whether APRO adjusted its delay claim to remove time attributable to the beam pocket work.

8. Coakley

Coakley seeks $468,204: $120,811 for labor inefficiency and $347,393 for change work. Exhibit 41 at 940; Exhibit 252 at 46-52.

Labor inefficiency costs. Coakley seeks to recover the labor inefficiency costs it incurred at the end of the project when it was directed to work overtime beginning in September 2008. Transcript at 3496, 3515-16. Coakley was paid the direct costs of its overtime in change orders signed by Coakley beginning at the end of October 2008 through the beginning of 2009. Transcript at 3538; Exhibit 76 at 29-31, 43-55. Each of these change orders contained a release that stated:

> Through acceptance of this change order, the Subcontractor acknowledges that it has reviewed the progress of the Work related to this Project and the potential impact of the added work on the progress of the project in the future. As a result, this Change Order includes compensation to the Subcontractor for any and all effects, delays, inefficiencies or similar demands associated with this project and the Subcontractor recognizes that there is no basis for any such claim in the future.

Id. at 29. Coakley's vice president testified that Coakley did not intend to release its claims for labor inefficiency when it signed these change orders and that Coakley "continued to interact" with Turner regarding its claim after the project was completed. Transcript at 3517, 3529.

Coakley's labor inefficiency claim involves only its activities on the first and second floors of the project—those activities that were most affected by the loss of productivity. Transcript at 3510; Exhibit 41 at 940. Coakley used a total cost method to quantify its labor

inefficiency claim, stating that it could not use a different method given the pervasive impact of the overtime on its efficiency.[34] Exhibit 41 at 936-40; Transcript at 3506-08, 3518. Coakley's vice president testified that Coakley's cost estimate was reasonable because its hours for the fourth and fifth floors, where it had fewer problems, matched its estimate. Transcript at 3466-68, 3508; Exhibit 41 at 941.

Coakley calculated the total labor costs for certain activities on the first and second floors and subtracted its estimated labor costs from that figure to arrive at its claim for $79,719. Exhibit 41 at 940; Transcript at 3512. Coakley applied its rates for labor burden, fringe costs, overhead, and profit to derive a total claim of $120,811. Exhibit 41 at 940; Transcript at 3512. Coakley's vice president testified that Coakley was not responsible for any of the labor inefficiency costs it claims, Transcript at 3516, but acknowledged that Coakley had not looked into what created the need to accelerate at the end of the project. *Id*. at 3539.

Pending changes. Coakley also seeks $347,393 for 130 pending change orders (PCO) listed in Turner's indicated outcome report (IOR). Transcript at 3522; Exhibit 252 at 46-52. Coakley's vice president testified about only two of these orders, 273.1 and 876. Exhibits 682, 1532. Unlike the other subcontractors, who included the pending change orders in their claim amounts, Coakley did not include these amounts in its claim to Turner.[35]

Smithsonian asserts that Coakley has not established that these costs are Smithsonian's responsibility. With regard to PCO 876, Smithsonian notes that Turner's IOR report indicates that some costs will be backcharges to SOM. With regard to PCO 273.1, Smithsonian notes that Turner included an estimate of $145,000 for this work in its 95% price proposal, and only $20,000 had been spent at that time. Exhibit 682 at 3. Smithsonian

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[34] Turner apparently adjusted the subcontractor claim amounts to remove amounts paid through change orders or owed through retention. Exhibit 257 at 4. However, the amount of Coakley's claim did not change. The Board cannot tell whether no adjustment was made because Coakley had already made the adjustments. In addition, Coakley's vice president testified that Coakley used a measured mile analysis to quantify its claim, but his testimony about the claim and appellant's brief describe a claim based upon the total cost method. Transcript at 3512; Appellant's Brief at 65.

[35] PCO 273.1 and 876 are on Turner's list of pending change work. Exhibit 5343. Turner's claim to the contracting officer includes an amount for "subcontractor pending changes" in the amount of $1,495,233, but Turner never explained what amounts are included in this figure. Exhibit 41 at 656.

asserts that this budget amount should have been sufficient for the work. Respondent's PFF ¶ 748. Coakley and Turner provide no factual response.

VI. Smithsonian's Counterclaim for Overpayment

A. Audit Report and Contracting Officer's Decision

Following the Board's April 2013 decision, Smithsonian's counsel retained Mr. DuVal to independently review and audit certain contractual costs related to Turner's claims. Exhibit 236 at 3. Prior to conducting his audit, Mr. DuVal reviewed the contract and Turner's 2011 claim, and then met with various Smithsonian personnel to walk the site and review the general scope of the project. Transcript at 4786-88.

The Board heard conflicting testimony regarding whether Mr. DuVal met with knowledgeable Smithsonian personnel. Smithsonian's COTR testified that he never met Mr. DuVal or his staff, Transcript at 4317, while Mr. DuVal testified that he met with the COTR prior to issuing his report and during the presentation of it. *Id*. at 4986. Regardless of whether the COTR and Mr. DuVal met, Mr. DuVal never had substantive discussions with any Smithsonian personnel concerning the technical aspects of his report. *Id*. at 4980-81, 5002-04, 5071-72, 5079. Instead, he relied solely upon the documents provided to him by Turner and Smithsonian. *Id*. at 4787-88, 4879, 4887-88, 4892. Prior to issuing his report, Mr. DuVal met with Dorothy Leffler, the contracting officer, in a meeting that she testified took "probably at least two hours." *Id*. at 4639-40, 4670. Mr. DuVal issued his report on June 2, 2014.[36] Exhibit 236.

Finding that Turner had not contemporaneously tracked its costs as priced and unpriced work, Mr. DuVal deemed all costs to be for unpriced work and examined all of the costs Turner expended on the project. Exhibit 236 at 6. Based upon his review, Mr. DuVal "questioned $40,480,621 of costs that are not adequately supported in accordance with Turner's contract with [Smithsonian] or with the FAR." *Id.* at 4. Mr. DuVal disclaimed any responsibility for determining the allowability of such costs, instead characterizing his role as to question costs to permit Smithsonian to make determinations regarding allowability. Transcript at 5070-71.

On July 28, 2014, Ms. Leffler issued a two-page final decision, in which she again denied Turner's 2011 claim for $14,094,978 and sought repayment of $24,517,558 for

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[36] Mr. DuVal issued a second report in May 2015. Exhibit 4738. We discuss Mr. DuVal's opinions set forth in the 2014 report because it was the basis for the contracting officer's claim for repayment.

alleged overpayments, "based on Turner's noncompliance with the Contract terms and other improper billings." Exhibit 237. Neither Smithsonian nor its auditors discussed the audit findings with Turner prior to this final decision.[37] *Id*. at 1422-25. In her decision, Ms. Leffler noted that she "agree[d] with the entire $40,480,621, questioned by the Smithsonian's auditors," and listed the same categories of costs questioned by Mr. DuVal. Exhibits 236, 237; Transcript at 4648-49. Ms. Leffler attached Mr. DuVal's June 2014 report to her final decision. Prior to issuing the July 2014 final decision, Ms. Leffler did not discuss the audit report with the former contracting officer, the COTR, or the Deputy Director of OPDC. Transcript at 4662-63.

Ms. Leffler understood that, as the contracting officer, she ultimately bore the responsibility to decide the claims. Transcript at 4647-48. However, she seemed unaware of the elements of the audit findings and their relation to the amount Turner spent on the project. For example, Ms. Leffler did not know that, as a result of the deduction of costs of "sole-source" contracts, Turner would not be paid for any of the effort to manufacture and install the abstract flag art installation or abate the hazardous material found throughout the building. *Id*. at 4664-68. When these points were brought out during testimony, Ms. Leffler simply stated that she relied upon Mr. DuVal's findings and stood by the results of the audit. *Id*. at 4691-93. Based upon her testimony, it appears that Ms. Leffler adopted Mr. DuVal's report wholesale without further investigation or evaluation of his findings and failed to exercise her independent judgment. *See id*. at 4665-93.

B. Bases for Repayment Claim

Because Mr. DuVal's analysis is the basis for Smithsonian's claim for repayment, the Board analyzes the grounds for Mr. DuVal's findings. Smithsonian's claims for repayment can be grouped into six categories.

1. Sole-Source Subcontract Costs

Mr. DuVal identified two categories of sole-source subcontracts the costs of which Smithsonian sought repayment in their entirety: (1) costs paid on fifteen sole-source subcontracts totaling $4,879,121, and (2) costs of twenty-five subcontracts totaling $1,947,186, for which the information provided by Turner did not indicate whether the contracts had been competitively bid. Exhibit 236 at 17-18. In its post-hearing briefing,

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[37] Mr. McGeehin, Turner's cost expert, and Turner's program manager met with Kenrich personnel prior to the June 2014 report, but the purpose of the meeting was to request documents, not to substantively discuss Mr. DuVal's findings. Transcript at 1598-99.

Smithsonian appears to have collapsed these two categories into one and altered its basis for seeking repayment of these costs.

Mr. DuVal questioned all of the sole source subcontracts because Turner could not produce documentation to establish the reasonableness of the costs incurred. Transcript at 4940, 4946. Because these subcontracts were not competitively bid, Mr. DuVal was not "sure if the amounts are reasonable or not." *Id*. at 4940. Mr. DuVal did not ask Turner about the reasonableness of the pricing during the audit. *Id*. at 4998. Instead, he asked Turner to confirm that the subcontracts were sole source. *Id*. Similarly, Mr. DuVal did not ask the contracting officer's technical representative or any of Smithsonian's engineering staff whether the costs were reasonable. *Id*. at 5003. He explained that it was not relevant to his audit what work was performed pursuant to these subcontracts. *Id*. at 5000.

During the audit, Turner produced its corporate purchasing manual, which provides that goods and services shall be procured through competition whenever possible. Exhibit 1476 at 7. The manual acknowledges, however, that there are situations in which competition cannot be obtained, such as for "proprietary items, trades that lack more than one qualified source, situations where one source is uniquely qualified to provide the goods or services, and instances where there is not enough time to seek and evaluate more than one proposal." *Id*. In these instances, Turner's policy requires that the group vice president must approve purchases of $2000 or more. *Id*.

Turner's purchasing manager and superintendent testified that Turner's corporate acquisition policies and practices were followed. Turner's purchasing department, Turner's primary liaison to the subcontracting community, awarded the subcontracts for the major buys and allowed field personnel to award second-tier subcontracts. Transcript at 494-95. The purchasing department generated award memoranda and subcontractor approval requests, which Mr. DuVal audited, to keep the field personnel abreast of what the purchasing department purchased. Transcript at 496-97. Field personnel did not generate award memoranda because they did not need to notify themselves of their purchases. Transcript at 501. When there was not documentation in the file regarding the sole-source subcontracts, Turner's vice president of operations approved the acquisitions on-site, as required by Turner's purchasing manual. *Id.* at 1750-51. Turner also used the collective experience of its senior managers, engineers, and, at times, estimating department to assess the reasonableness of field purchase proposals. *Id*. at 1753.

Turner awarded the sole-source subcontracts because the work required was minimal, Turner was operating under a time constraint, or Turner found that only one vendor could provide the service. Transcript at 1751-52. For example, Turner awarded a sole-source subcontract to King Architectural for signs. *Id*. at 693; Exhibit 745. According to the award

memorandum, the contractor was recommended by Turner's signage designer and there were no other bidders for the work. Exhibit 745. Similarly, Turner awarded a subcontract for $20,000 to Worcester Eisenbrandt, S.A., on a sole-source basis for temporary exterior walls so Smithsonian could move current exhibits out of the construction zone. Transcript at 857; Exhibit 3065. This contract was let at the request and with the approval of Smithsonian to meet the tight deadlines for construction. Transcript at 857. Turner awarded a sole-source subcontract to Lord & Company, Inc. (Lord) for relocation of a radio antenna, because Lord installed the antenna originally, Smithsonian recommended Lord, and Turner determined that the price Lord offered was reasonable. *Id*. at 1765; Exhibit 3157. Turner procured several items, such as door mats and landscaping, on a sole-source basis because there was no time for a full procurement right before the museum reopened; these purchases were approved by Turner's vice president. Transcript at 1756, 1760.

Several of the sole-source contracts questioned by Mr. DuVal were for items requested by Smithsonian. The abstract flag, a signature piece of artwork installed in the museum during the renovation, was designed by the Secretary of the Smithsonian, Lawrence Small, the director of the Museum of American History, Dr. Brent Glass, SOM, and Turner. Transcript at 837. The structure itself was made of a "very special-grade of high-grade structural stainless steel" that was created "to mimic a flag that's waving in the breeze." *Id*. at 838. Turner subcontracted with one firm because it made the metal pieces that moved to create the flag waving effect that Secretary Small and Dr. Glass approved. *Id*. at 840. Turner subcontracted with another firm to assist SOM with the design of the abstract flag because of its expertise with "high-strength stainless steel structural shapes." *Id*. at 838. Turner also chose both these firms because "[n]obody else could do the work." *Id*. at 841. Turner subcontracted with a third firm on a sole-source basis to assemble, weld, and install the artwork at its place in the museum when it found no local bidders willing to take on the risk of the project. *Id.* at 841. All three sole-source subcontracts were within the budget set for the abstract flag. *Id*. at 844.

Similar facts surround Turner's decision to sole-source the contract for the installation of a barrisol ceiling, which is made of a unique product that diffuses light shining through from above. There were existing barrisol ceilings in the museum, and Smithsonian required that this particular ceiling be reinstalled in a section of the renovated area. The manufacturer of the barrisol ceiling requires that it be installed by licensed vendors. Turner issued a sole-source subcontract for the installation of the ceiling to the licensed vendor it had used on a previous project at the museum. *Id*. at 554-55. Smithsonian mentioned none of these facts

relating to the abstract flag or the barrisol ceiling in the July 2014 final decision. Exhibit 237.[38]

Mr. DuVal highlighted Turner's subcontract with its own subsidiary, Turner Logistics, which competitively procured long-lead items such as air handling units and generators. Transcript at 566, 4947. Mr. DuVal found nothing in the procurement files produced that indicated Turner evaluated the reasonableness of costs of the items it procured through Turner Logistics. *Id*. at 4948.

Turner Logistics has relationships with manufacturers from which it can purchase equipment in bulk and receive preferential pricing and scheduling. Transcript at 564-65. Turner Logistics also has subject matter expertise in mechanical and electrical equipment, its primary areas of focus. *Id*.

Smithsonian objects that both Turner Logistics and Turner unreasonably marked up their work for overhead and profit. Although the prices for the items Turner Logistics purchased were definitized in a modification early in the project, and Smithsonian was aware of the arrangement, Exhibits 236 at 17, 5121, Smithsonian asserts that, if Turner had purchased the equipment directly from the vendors and applied the agreed-upon 6% overhead and profit markups, it would have paid $1,234,900, rather than the $1,741,603 that Turner charged through Turner Logistics. Respondent's Brief at 105. Smithsonian's challenge is not to the reasonableness of the price that Turner Logistics paid, but to the burdens that Turner placed upon that price. It appears that Mr. McGeehin, in his review of the claim, may have removed the duplicative profit and overhead. Transcript at 1567, 4801. To the extent Smithsonian's challenge is one of reasonableness, Smithsonian assumes that Turner would have been able to obtain the same price as Turner Logistics, an assumption not supported by the record. Transcript at 1567.

2. Time and Materials (T&M) Subcontracts

Mr. DuVal questioned $979,225 in costs incurred on T&M subcontracts because Turner did not maintain sufficient records. Exhibit 236 at 28-29. Mr. DuVal explained that he sought to do an invoice hour reconciliation, which reconciles the hours sought on a request for payment against "supporting documentation." Transcript at 4902. Mr. DuVal did not know whether Turner had reconciled and verified the T&M tickets contemporaneously. *Id*. at 5088. If Turner did so, Mr. DuVal said, he wanted to review the

[38] In its post-hearing brief, after hearing the testimony of Turner's witnesses, Smithsonian properly withdrew its claim for repayment of the amounts paid on sole-source subcontracts for the abstract flag and barrisol ceilings. Respondent's Brief at 103.

records of the reconciliation. *Id*. Absent records of a contemporaneous reconciliation, Mr. DuVal insisted that it was necessary for him to perform a reconciliation "[b]ecause I don't know what they did to sign off on the ticket." *Id*. at 5089. Neither Mr. DuVal nor Smithsonian identified a requirement in the FAR or Turner's contract that this reconciliation be performed.

Turner contemporaneously reviewed and verified the accuracy of the T&M tickets. During the project, the subcontractors that worked on time and materials subcontracts would submit time and material tickets to Turner's superintendent and his staff for review around the time the work was performed. Transcript at 1051-52, 1129-30. This review involved verifying that the tickets accurately reflected the time worked and work performed. *Id*. at 1125, 1661. The subcontractors would not be paid until Turner personnel reviewed the tickets. *Id*. at 1096. Mr. McGeehin, Turner's expert, testified that in forty years of experience, he has "never heard of anybody tak[ing] the position that if you didn't do a labor hour reconciliation of T&M tickets, then those costs are unreasonable." *Id*. at 1461-62. Mr. DuVal acknowledged that he understood the phrase "generally accepted accounting principles and practices" as used in the Audit clause to require Turner to maintain its cost records as firms in the construction industry do. *Id*. at 4782-83.

3. Change Order Costs

Smithsonian's largest claim for repayment involves change order costs. Mr. DuVal questioned more than $18 million in change order costs because Turner did not produce "the required documentation for the majority of subcontractors." Exhibit 236 at 31.[39] Mr. DuVal understood that Turner had hired these contractors to perform the change order work on a time and materials basis, but he was unable to verify the costs of this work because (1) Turner had no daily tickets for some of the work, (2) the daily tickets that were provided had no names of individuals performing the work or descriptions of the work performed, or (3) the daily tickets did not have sufficient information to allow Mr. DuVal to reconcile the amounts to the change order or potential change order. *Id*. Because he was unable to audit these costs, Mr. DuVal found that Turner failed to establish their reasonableness.[40]

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[39] At the hearing, in response to a question by the Board, Mr. DuVal said he did not not question any costs on this basis. Transcript at 4854-55. Contrary to Mr. DuVal's testimony, it appears that the failure to provide documentation was his basis for questioning the costs.

[40] In attempting to connect the need for T&M tickets and reasonableness, Mr. DuVal explained that one determines reasonableness by looking at actual costs. Transcript at 5025. However, Mr. DuVal never explained how the actual cost helps to explain

Mr. DuVal also relied upon the provision of the Equitable Adjustment clause that required Turner to provide to the COTR daily T&M tickets for work that the contracting officer elects to have performed on a time and materials basis. Although Smithsonian did not identify any work that the contracting officer elected to have performed on a T&M basis, Mr. DuVal believed that Turner and its subcontractors were bound by this provision through operation of the flowdown clause of the contract and relied upon this clause as a further basis to question the change costs.

Mr. DuVal also noted that the contract contained limitations upon the incurrence of overtime and that the change order documentation that he reviewed indicated charges for overtime. Exhibit 236 at 29. However, Mr. DuVal did not identify a dollar amount either in testimony or in his report that was challenged on this basis. Without this information, the Board is unable to consider this aspect of Smithsonian's claim.

In its post-hearing briefing, Smithsonian contends that Turner approved proposed changes without obtaining the required itemization of subcontractor costs. Respondent's Brief at 99; Respondent's PFF ¶¶ 689-95. Smithsonian did not raise this argument until its proposed findings of fact and elicited no testimony on either direct or cross-examination concerning this argument. The Board does not find that the evidence cited in support of these proposed findings supports Smithsonian's contention. In fact, detailed estimates were provided by Turner's subcontractors. *See, e.g.*, Exhibit 100 (cited in Respondent's PFF ¶ 691).

Mr. DuVal questioned the costs of change work even though the changes were all fixed price. Transcript at 5030-31. During the project, Turner started some of the change work on a time and materials basis and then negotiated a lump-sum settlement either during or after the work was complete. *Id*. at 1146, 1588, 1659-61, 4919. Turner's superintendent again testified that he followed Turner policy and reviewed each T&M ticket when it was submitted to verify that the tickets reflected the work actually performed. *Id*. at 1125-26. Once a lump sum was negotiated for a change, Turner disposed of the T&M tickets to ensure that there was no confusion as to the basis for the costs. *Id*. at 1148.

Mr. DuVal did not ask the contracting officers or the COTR whether they expected Turner to maintain T&M tickets for fixed-price change work. Transcript at 5035. On cross-examination, Mr. DuVal distinguished between work performed before and after a firm fixed price was negotiated, explaining that he would not seek T&M tickets for work performed after the price was agreed upon by the parties. *Id*. at 5030. However, it does not appear that

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reasonableness or how the time and materials tickets provide the information to be evaluated pursuant to FAR 31.201-3.

Mr. DuVal attempted to determine the amounts to which this distinction would apply. *Id*. at 5025, 5031-32. Mr. McGeehin testified that the records that Mr. DuVal sought were not records that would be generated for a fixed-price contract or that Turner would request from its subcontractors. *Id*. at 1408.

Personnel from Smithsonian and Smithsonian's contract administration consultant contemporaneously reviewed, negotiated, and approved change order costs and found them to be reasonable, prior to paying Turner. Transcript at 3761-62, 3843-44, 4256-58; *see, e.g.*, Exhibits 4770. Mr. DuVal did not analyze which change orders were approved by Smithsonian or discuss the approvals with Smithsonian personnel. Transcript at 5038-39. As Mr. DuVal explained, he was "hired to do an independent audit and I don't know what they reviewed or didn't." *Id*. at 5039-40. Moreover, Mr. DuVal asserted that he was in a better position than the Smithsonian COTR to evaluate the documentation, or lack of documentation, underlying the agreed price, from an accounting perspective regardless of any analysis that Smithsonian contracting personnel may have performed. *Id*. at 5041.

Mr. DuVal also questioned $107,426 that Turner paid subcontractors in excess of the subcontract values. Exhibit 236 at 31-32; Respondent's PFF ¶ 854. Mr. DuVal explained that Turner overpaid the subcontractors because "Turner would issue a back charge . . . and [the subcontractors] did not." Transcript at 4938. However, Mr. DuVal failed to account for credits in subsequent change orders between the subcontractors and Turner. *Id*. at 5066-69; Exhibits 3232 at 177-78, 285, 287; 3607 at 66-67. The amounts in the subcontract subledger, which is the basis of Turner's claim, accurately reflect the subcontract values, amounts invoiced, and amounts paid. Exhibit 3028 at 98.

In a footnote, Mr. DuVal noted that he did not observe that Turner had reconciled amounts for "contractual allowances of hours," but he did not include a dollar amount associated with this comment. Exhibit 236 at 31 n. 50. At hearing, Mr. DuVal expanded upon this comment, explaining that he had not seen documentation tracking allowances or crediting amounts back for allowances not used. Transcript at 4918-19. Turner's project manager explained that the superintendent would review tickets against allowances and hours would be reconciled upon close-out of the contract. Exhibit 3248 at 3; Transcript at 1790.

4. Unapplied Back Charges, Design Issues, and Interference Issues Not Credited, and Unauthorized Cost Increases

Mr. DuVal identified another $679,547 consisting of what he thought were unapplied back charges, design issues, and interference costs that should have been credited to Smithsonian. Exhibit 236 at 25-26, 28. Mr. DuVal's primary source for identifying these charges was a report provided by Turner called the indicated outcome report (IOR).

Transcript at 4885. In this report and other documentation, Mr. DuVal found listed among the charges notations indicating that a charge or cost was a potential backcharge to the subcontractor. *Id*. at 4878. Mr. DuVal used this same report and other documentation to compile a list of design issues. Exhibit 236 at 25-26; Transcript at 4887; *see, e.g.*, Exhibits 76 at 5-10, 551 at 9, 13. Mr. DuVal did not make an independent technical determination as to whether these costs were appropriate back charges or attributable to design issues. Instead, he chose to rely solely upon the notations found on the documents. Transcript at 4879, 4887. Mr. DuVal assumed that all costs that he found labeled possible back charges or design issues should be treated as credits to Smithsonian. *Id*. at 4889.

Turner's project manager explained that the IOR document upon which Mr. DuVal relied to identify backcharges was not an accounting record or a final determination of what backcharges were owed. Instead, Turner examined the backcharges that it was unable to recover from subcontractors and removed a total of $143,000 in such backcharges from its claim. Transcript at 1911-12.

For the category of costs Mr. DuVal identified as "interference issues not credited," he questioned, in change orders, costs labeled "steel interference or interference in any fashion." Transcript at 4891-92; Exhibit 236 at 28. Mr. DuVal said the costs should be disallowed based on correspondence between Smithsonian and Turner stating that Smithsonian would not be responsible for some costs associated with the interferences. Transcript at 4893-95; Exhibits 601 at 9-10, 117 at 2. Again, Mr. DuVal did not review drawings or confer with Smithsonian personnel prior to determining that interference costs were the responsibility of one party or another. Transcript at 4892, 4895-96.

Mr. DuVal also questioned $169,332 of what he thought were unauthorized cost increases, based solely upon his review of requests for information submitted to the design team during construction. Exhibits 236 at 26-27, 3718 at 172-73, 1080 at 3. For this category, Mr. DuVal relied entirely on the documents without further analysis of the allowability of the costs. Transcript at 4897.

5. Change Order Costs Questioned Under the Equitable Adjustment Clause

Mr. DuVal questioned another $894,921 on the ground that the limits on overhead and profit in the Equitable Adjustment clause were "not consistently followed" by Turner and its subcontractors in change order proposals. Exhibit 236 at 20; Transcript at 4866. Mr. DuVal identified fifty-three subcontractor proposals that allegedly exceeded or contravened these limitations. Exhibit 236 at 22. Smithsonian notes that Turner removed some, but not all, of these potentially unallowable costs from its change order proposals. *See, e.g.*, Exhibit 3432

at 6-9. Mr. DuVal did not recall whether he reviewed the change order requests submitted by Turner "to determine whether the COTR approved the supervision and miscellaneous expenses." Transcript at 5074. Mr. DuVal did not discuss with Smithsonian contracting personnel their review and approval of change order proposals, or whether they had approved working supervision as a direct cost on change orders. *Id*. at 5039, 5072. Instead, he assumed that Smithsonian contracting personnel reviewed the proposed change orders and determined whether they had previously approved this direct cost. *Id*. at 5078-79.

In post-hearing briefing, Smithsonian listed several examples of subcontractors' change order proposals that violated these limits. Respondent's PFF ¶¶ 683-87. Smithsonian reviewed and approved some, but not all, of these proposals. *See, e.g.*, Exhibit 3437. However, the Board cannot tie any of these examples to amounts identified by Mr. DuVal in his report. Mr. DuVal testified about one of these seven change order proposals, Transcript at 4866-68 (discussing Exhibit 89, change order proposal from Welch & Rushe), but the Board does not see a corresponding entry for that proposal on the table in his report.

6. Costs in Excess of Payment

Mr. DuVal also questioned $908,873 in costs that Turner identified in its ledger as remaining to be paid. Transcript at 4936. Turner's project manager and Mr. McGeehin explained that these amounts are due to subcontractors and others. Transcript at 1789-90, 1456-57. Mr. McGeehin further explained that, under an accrual accounting system, which Turner uses, the obligation to pay these amounts remains. Transcript at 1456-57; *see also* Exhibit 250.[41]

Discussion

I. Overview

This case is, to our knowledge, unique. We must decide, among other novel issues, what Smithsonian should pay Turner for the substantial portion of the renovation project that the parties expected to include in the fixed price prior to completion, but never did. Broadly speaking, the parties assert four types of claims: (1) Turner's claim for the costs of the second steam generator; (2) Turner's claim for additional general conditions costs; (3) claims passed through by Turner for extra work and inefficiencies encountered by its subcontractors (which are Turner claims for our purposes); and (4) Smithsonian's claim for repayment based

[41] Mr. DuVal also questioned $355,187 in general liability insurance and bond costs. Exhibits 236 at 37. These costs are part of Turner's affirmative claim discussed above.

on allegedly unsupported and unallowable costs. Except for the burden of proof with regard to reasonableness discussed below, each party bears the burden of proof on its own claims. *See Essex Electro Engineers, Inc. v. Danzig*, 224 F.3d 1283, 1295 (Fed. Cir. 2000) (Turner and its subcontractors "must establish the extent of the delay, [Turner's] harm resulting from the delay, and the causal link between the [Smithsonian's] wrongful acts and the delay"); *Sauer Inc. v. Danzig*, 224 F.3d 1340, 1348 (Fed. Cir. 2000) (delay and disruption claims are different, and Turner and its subcontractors need not prove excusable delay to recover on their disruption claims); *Thermalon Industries, Ltd. v. United States*, 51 Fed. Cl. 464, 472 (2002) (Smithsonian must establish that the amounts for which it seeks repayment exceed the amounts permitted by statute, FAR clause, or contract); *see also Roberts v. United States*, 357 F.2d 938, 943 (Ct. Cl. 1966).

Turner seeks recovery of its two direct claims on the basis of quantum meruit, i.e., "what it has earned." Quantum meruit (or quantum valebant for goods) is the standard measure of recovery when a contract lacks a definite price term, either because the price was knowingly left open, *e.g.*, *Cities Service Gas Co. v. United States*, 500 F.2d 448, 457 (Ct. Cl. 1974); *Pacific Maritime Association v. United States*, 108 F. Supp. 603, 607 (Ct. Cl. 1952); *see also* U.C.C. § 2-305 (2002) (price is "reasonable price at the time for delivery"), or the written contract was void ab initio, but was performed in accordance with a valid meeting of the minds, creating an implied-in-fact contract. *See Clark v. United States*, 95 U.S. 539, 542 (1877)*; United States v. Amdahl Corp*., 786 F.2d 387, 395 (Fed. Cir. 1986); *cf. Beta Systems, Inc. v. United States*, 838 F.2d 1179, 1185-86 (Fed. Cir. 1988) (directing Armed Services Board of Contract Appeals on remand to void and "reform" a price clause to make it fair if the board found the clause unlawful).

Smithsonian objects, arguing that quantum meruit is awarded *only* to redress illegality or when a contract is found to be implied-in-law. Although there is a suggestion in the Board's precedent that quantum meruit is a measure of recovery associated with implied-in-law contracts, over which the Board lacks jurisdiction, *Guilltone Properties, Inc*., HUDBCA 02-C-103-C4, 06-1 BCA ¶ 33,249, at 164,787, subsequent Federal Circuit decisions clearly state that quantum meruit is a proper remedy for an implied-in-fact contract. *International Data Products Corp. v. United States*, 492 F.3d 1317, 1325 (Fed. Cir. 2007) (citing *United Pacific Insurance Co. v. United States*, 464 F.3d 1325, 1329-30 (Fed. Cir. 2006)). Here, we have a contract that was performed partly for a fixed price and partly for no definite price. Regardless of whether we describe it as an implied-in-fact contract or an express contract with a missing price term, our task is to definitize the undefinitized portion of the price after the fact.

Moreover, the label "quantum meruit" does not tell us exactly how to calculate that value. Ordinarily, "value determined on a quantum meruit basis . . . is not based on costs nor

a reasonable return on investment of the seller, but on the reasonable value in the marketplace." *Cities Service*, 500 F.2d at 457 (emphasis omitted). That is impossible here, as there is no marketplace for complex design-build renovations of active, fifty-year-old museums. The Court in *Yosemite Park v. United States*, 582 F.2d 552 (Ct. Cl. 1978), in awarding quantum meruit under a park concession contract, held that "the value of services rendered" should include the concessionaire's labor direct costs, "a reasonable return on money invested in the equipment," and profit. *Id*. at 561. Other courts have used similar measures under non-government construction contracts. *Continental Casualty Co. v. Schaefer*, 173 F.2d 5, 8 (9th Cir. 1949) ("[t]he reasonable value of the work and materials furnished plus overhead and profit."); *Sea Byte, Inc. v. Hudson Marine Management Services, Inc.*, 565 F.3d 1293, 1303 (11th Cir. 2009); *Aniero Concrete Co. v. Aetna Casualty and Insurance Co.*, No. 94 Civ. 9111(CSH), 2002 WL 31410641, at *1 (S.D.N.Y. Oct. 25, 2002). We adopt this approach. The reasonable value of the unpriced work under this contract consists of Turner's reasonable direct and indirect costs of meeting the unpriced contract requirements, plus reasonable markups. We address below what "reasonable" means in this context.

Under this approach, we are not equitably adjusting the contract price. We are finalizing the price of the base contract work. Consequently, we are not bound, as Smithsonian argues, either by the types or amounts of costs recoverable under the Equitable Adjustment clause, or by Turner's agreement to limit its general conditions and fee on changes to 6%. Smithsonian's argument that the quantum meruit approach amounts to a "total cost claim" is likewise misplaced. Total cost is a disfavored means of proving an equitable adjustment or breach damages. *See Propellex Corp. v. Brownlee*, 342 F.3d 1335, 1339 (Fed. Cir. 2003). It "assumes all costs over what was bid and paid are due to the claimed changes." *Moshe Safdie & Associates, Inc. v. General Services Administration*, CBCA 1849, et al., 14-1 BCA ¶ 35,564, at 174,300. Turner's direct claims relate to base work, not to changed work, and do not rest on a breach theory. Nor will we refer to the difference between Turner's costs for the unpriced work and any "bid" by Turner for that part of the project. We must examine Turner's costs, but Turner has no total cost claim.

Smithsonian argues that Turner's quantum meruit theory constitutes a "new claim" that Turner failed to raise in its claim or complaint. To the contrary, Turner has consistently claimed the costs it reasonably expended on this project. At most, Turner's embrace of the quantum meruit label at the hearing "asserts a new legal theory for the recovery originally sought," and is not a new claim. *Ketchikan Indian Community v. Department of Heath & Human Services*, CBCA 1053-ISDA, et al., 13 BCA ¶ 35,436, at 173,808-09 (citing *Scott Timber Co. v. United States*, 333 F.3d 1358, 1365 (Fed. Cir. 2003)). We also reject Smithsonian's objection that Turner's calculation of reasonable costs incorporates the assumptions and clarifications that Turner set forth in its 95% proposal, and thus effectively

shifts to Smithsonian risks that Turner had assumed under the design-build contract. We emphasize again: had Smithsonian either accepted or rejected Turner's assumptions and clarifications and negotiated a fixed price covering the remaining contract work, the Board would be left to enforce the contract as written. Smithsonian asks us, instead, to ignore Turner's assumptions and clarifications, as well as the absence of a definitized price, but to enforce the contract's original allocation of risks. This could leave Turner with all of the risks and no remedy, which we cannot accept, particularly given the significance of the risks of unforeseen and hazardous conditions that the assumptions and clarifications were intended to address, and the balance of equities between the parties. Smithsonian accepted unpriced renovation work. It must accept a method of pricing that work. Ultimately, we award Turner the reasonable costs of both the second steam generator and general conditions.

The pass-through claims and Smithsonian's claim require a more conventional approach, and we address them essentially as we would claims in any construction dispute. If we found any merit in Smithsonian's excess payment claim, we would likewise need to subtract Smithsonian's recovery from Turner's cost pool, but, as we explain, we do not.

II. Turner May Recover a Reasonable Price Under Quantum Meruit

A. Turner May Recover the Costs of the Second Steam Generator

We start with the steam generator claim because it is the most straightforward. Turner seeks the costs of installing the second steam generator, under the quantum meruit theory, as part of the reasonable costs of meeting the contract requirements. Smithsonian argues that Turner's work on the mechanical systems, including the first steam generator, was definitized with the submission and acceptance of the 95% drawings and specifications, and that the need for the second generator arose from a design error for which Turner was responsible. Respondent's Brief at 89 (citing Smithsonian PPF ¶¶ 123, 169).[42]

It is true that the system Turner originally designed and installed did not meet the performance requirements for humidity levels. The actions attributable to Smithsonian—doors being left open and attempts to override the controls—did not cause this

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[42] Smithsonian also asserts that the warranty provision of the contract makes Turner responsible for these costs. Smithsonian Brief at 86 (citing Respondent's PFF ¶ 169). The warranty provision requires Turner to warranty the performance of the systems and equipment it installed, but is not applicable here. As the AECOM engineer testified, the first steam generator was performing as it should have; it just was not adequate to meet the humidity requirements.

failure. Moreover, as the AECOM engineer testified, Turner should have known the quality of the GSA steam and factored it into its design.

However, this simply means that two steam generators, rather than one, as Turner anticipated, were required to satisfy the performance specification with respect to humidity. *See P.R. Burke Corp. v. United States*, 277 F.3d 1346, 1357 (Fed. Cir. 2002) (emphasizing distinction between design and performance specifications). Smithsonian ultimately accepted a working steam system with two generators and must pay a reasonable price for it, based on cost. Smithsonian offered no evidence that either the price of the second steam generator or Turner's markups are unreasonable. Turner may recover $438,668, which includes the direct costs of Welch & Rushe's effort plus reasonable profit, insurance costs, and bond costs. Turner may also recover interest, calculated in accordance with the Disputes clause.

B. Turner May Recover Some General Conditions Costs

Turner's quantum meruit claim for general conditions costs is more involved. "'General conditions costs' are expenses for project managers, supervisors, and clerical assistants; temporary offices and utilities and supplies for those offices; and other miscellaneous expenses necessary for on-site management of a construction project." *AMEC Construction Management, Inc. v. General Services Administration*, GSBCA 16233, 06-2 BCA ¶ 33,410, at 165,648. Turner directly provided all of these services here.

As explained above, Turner and its subcontractors incurred approximately $57 million in direct construction costs, of which approximately $45.4 million was for work that was never priced in a bilateral modification to the contract. Turner incurred about $10 million in general conditions costs for the construction effort. Based upon the ratio of the costs of the unpriced work to the total construction costs, Turner calculated that it incurred approximately $7.1 million in general conditions costs performing unpriced work. Adding to this figure the direct costs of unpriced construction work, Turner determined that it and its subcontractors incurred costs totaling $56.6 million on the unpriced effort. After subtracting the $49.6 million that it was paid, Turner is left with a claim of $7 million in general conditions costs.

The Board accepts Turner's approach of calculating reasonable general conditions costs in line with the percentage of unpriced work on the project. While Mr. DuVal called this approach unreliable when undertaken after contract performance, Turner was forced to develop its cost-based claim only after Smithsonian failed to negotiate a fixed price. Turner could not have known when it set up its accounting system for the fixed-price contract that it would need to segregate the costs of unpriced work to support a reasonable price.

However, we see two other problems with Turner's calculation. One, Turner includes in its pool of unpriced work both change work and pending change work. Neither of these amounts should be included, because they are not part of the base contract work we are trying to price. As explained, the parties negotiated prices for changes, even though those prices were ultimately issued in unilateral, rather than bilateral, modifications. Turner cannot renegotiate its general conditions percentages for the change work. When the costs of this additional work are removed, the direct costs of the unpriced construction work drop to $33 million, or about 62% of the total costs. Two, Turner multiplies the percentage of unpriced work by its *total* general conditions costs ($10 million), rather than focusing on the general conditions costs that Turner's expert said it *has not been paid* ($4,133,521). As Smithsonian emphasizes, we have no way to allocate the general conditions costs that Turner *has* been paid between the costs of priced work and the costs of unpriced work. (If we knew that the entire pool of unpaid general conditions costs related to unpriced work, Turner could be entitled to all of it.) The best we can do on this record is to award Turner a reasonable percentage of its unpaid general conditions costs. Adjusting Turner's calculation to correct for these two difficulties, we find that Turner is owed $2,562,783 (62% of $4,133,521). To this figure, we apply the percentages of 3%, 1.06%, and 1.624% for fee, bond and insurance costs for a total of $2,710,970. Turner may also recover interest, calculated in accordance with the Disputes clause.

Smithsonian does not dispute that Turner incurred $10 million in general conditions costs during construction. Instead, Smithsonian contends that Turner is not entitled to any additional general conditions costs because (1) Turner is seeking to recover these costs as a direct costs rather than as a percentage of costs as it agreed, (2) Turner is seeking to recover types of costs that are precluded by the Equitable Adjustment clause, and (3) Turner's costs increased due to problems for which Turner, not Smithsonian, is responsible. Smithsonian's first two objections are rooted in its belief that Turner seeks the increased costs of performance and, therefore, Turner's recovery is limited by the Equitable Adjustment clause and agreements regarding general conditions amounts on change work. Since we are seeking to determine the reasonable price of the base contract effort, these agreements do not apply. The Board has addressed Smithsonian's remaining concern by removing the pending change work from the pool of unpriced construction work. By excluding the pending change work, the Board excludes the costs of what Smithsonian finds most objectionable about Turner's claim (design issues, overtime, etc.), while still providing a basis upon which the Board can determine a reasonable price.

III. Turner May Recover on Some of Its Subcontractors' Claims

A. Only One Subcontractor Released its Claim

Smithsonian argues that Turner's subcontractors released their claims against Turner when they executed lien releases and change order releases throughout the contract. Respondent's Brief at 58. Because Turner has no remaining liability on these claims, Smithsonian argues, it too is relieved of liability under the *Severin* doctrine. *See Hedlund Construction, Inc. v. Department of Agriculture*, CBCA 105, 08-1 BCA ¶ 33,798, at 167,317. We read releases using the ordinary rules of contract interpretation. *See Holland v. United States*, 621 F.3d 1366, 1378 (Fed. Cir. 2010); *Metric Constructors, Inc. v. United States*, 314 F.3d 578, 583 (Fed. Cir. 2002). While the lien releases do not bar the claims, we find that the change order releases bar the claim presented by Coakley.

Four subcontractors executed documents called "affidavit, partial waiver of lien and release" to receive progress payments from Turner. Smithsonian notes that, as "owner of the project," it is one of the identified Released Entities. Smithsonian argues that the recital that the subcontractors "forever release . . . the Released Entities from any and all causes of action, suits, debts, accounts, damages, encumbrances, judgments, claims and demands whatsoever" bars all of the subcontractors' pass-through claims because they were not specifically reserved prior to the execution of the affidavits.

Such affidavits appear to be used by prime contractors to ensure that subcontractors are paying their employees, suppliers, and lower-tier subcontractors. *E.g.*, 1 Robert F. Cushman & James J. Meyers, *Construction Law Handbook* § 18.18[C][2] (1999). They "also assure a property owner and a lender that title to the land underlying construction is not encumbered by liens for unpaid labor or material." *George Hyman Construction Co.,* ENGBCA 4541, 85-1 BCA ¶ 17,847, at 89,357.[43] All four subcontractors point to evidence

[43] Smithsonian asserts that it is a third-party beneficiary of the lien release as the "owner of the project" and, thus, entitled to rely upon the release language. The Armed Services Board of Contract Appeals has found the Government to be a third-party beneficiary of such an agreement. *Caddell Construction Co.*, ASBCA 46231, et al., 95-2 BCA ¶ 27,772, at 138,460 (citing *Hughes Aircraft Co. v. United States*, 15 Cl. Ct. 550, 555 (1988)). However, subcontractor liens are not enforceable against property owned by the United States. *National Micrographics Systems, Inc. v. United States*, 38 Fed. Cl. 46, 52 (1997) (citing *Armstrong v. United States*, 364 U.S. 40, 42 (1960)). If subcontractors cannot assert liens against the Government, it is not clear that a release of a lien against the Government has legal effect, or that the Government would be a direct beneficiary of an agreement to release them. Instead, the Government may be "an incidental beneficiary . . . . [with] no

in the record that, despite the lien releases, Turner and the subcontractors understood that the subcontractors could submit claims based on performance difficulties.

The Federal Circuit reviewed a similar lien release in *Metric Constructors*. The Court noted first that the title of the document, "partial payment," suggested that the document was a "generic release form . . . intended to be applicable to partial payments generally, and not to be limited to final payments on [the] contract." *Metric Constructors*, 314 F.3d at 582. The lien releases here are titled "partial waiver of lien" and are clearly tied to the periodic progress payments made by Turner to its subcontractors. The Federal Circuit found further ambiguity because the release language was qualified by language relating to payments actually made on the contract through the progress payments. "[I]f the release were intended to be unqualified, there would be no need for any such language or qualification." *Id*. The language upon which Smithsonian relies is similarly qualified, tying the release of claims to the "delivery of material and/or performance of work relating to the project through Application for Payment No. [XX]." The Federal Circuit concluded that "the claim release clause and the lien release clause were intended to do no more than release the prime contractor (and the owner) from any claims or liens relating to the payments received." *Id*. at 583.[44] We hold similarly here. The lien releases do not bar the claims asserted by Turner on behalf of the subcontractors.

The release language in Turner's change orders does not bar APRO's or March Westin's claims, either. The change orders added or deleted specific items in the scope of work for each subcontractor. The releases focus upon the impact of the added or deleted work, and do not address claims for delay or disruption arising from unforeseen conditions or *other* changes. They therefore do not bar these two subcontractors' claims. *E.g.*, *Au' Authum Ki, Inc. v. Department of Energy*, CBCA 2505, 14-1 BCA ¶ 35,727, at 174,891.

Coakley's claim for labor inefficiency is barred. It arises from the direction to work overtime beginning in September 2008. Coakley was paid for this overtime under change orders that Coakley signed in October 2008 and later. Because the change was the direction to work overtime, the release language operates to bar Coakley's claim for the labor inefficiency arising from this direction. The testimony of Coakley's vice president that

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enforceable rights under the agreement." *Ables v. United States*, 2 Cl. Ct. 494, 500 (1983).

[44] The Federal Circuit also examined the applicable state law on liens and lien releases to determine the effect of the lien release at issue. *Metric Constructors*, 314 F.3d at 582-83. Here, the parties have not indicated which state law would govern the dealings between Turner and its subcontractors, so we have not analyzed this issue and have focused upon the language of the release itself.

Coakley did not intend to release its claims by signing these change orders cannot overcome the clear release. *See Bell BCI Co. v. United States*, 570 F.3d 1337, 1341-42 (Fed. Cir. 2009); *Walsh/Davis Joint Venture v. General Services Administration*, CBCA 1460, 12-1 BCA ¶ 34,968, at 171,903; *Turner Construction Co. v. General Services Administration*, GSBCA 15502, et al., 05-1 BCA ¶ 32,924, at 163,097.

B. The Equitable Adjustment Clause Does Not Preclude All of the Subcontractors' Claims

Smithsonian argues that Turner and its subcontractors may not recover any labor, inefficiency, or delay costs associated with changed work, based upon the language of the Equitable Adjustment clause. Respondent's Brief at 59-60. We agree but reiterate that the Equitable Adjustment clause does not apply to the extent the subcontractors seek delay and disruption costs arising from work on the base contract, which we view as subject to Turner's assumptions and clarifications. To the extent the subcontractors have proven constructive changes to the base contract work, we apply the Equitable Adjustment clause.

C. Labor Inefficiency Claims

1. Smithsonian is Liable for the Subcontractors' Lost Productivity

All of Turner's subcontractors seek costs of labor inefficiency due to the causes of disruption and delay discussed above. Delay and disruption claims are often presented together, but they are different, with different methods and requirements of proof. *States Roofing Corp*., ASBCA 54860, et al., 10-1 BCA ¶ 34,356, at 169,666.

"To recover for loss of labor efficiency[,] the contractor must demonstrate that a particular work activity was impaired by an action taken by the Government." *Stroh Corp. v. General Services Administration*, GSBCA 11029, 96-1 BCA ¶ 28,265, at 141,132 (citing *Southwest Marine, Inc*., ASBCA 39472, 93-2 BCA ¶ 25,682, at 127,764 (1992)). The focus of the inquiry is whether the Government's actions caused a change in working conditions that affected productivity. *Clark Construction Group, Inc*., VABCA 5674, 00-1 BCA ¶ 30,870, at 152,411. Productivity losses can be shown either as the direct result of a change, or through the cumulative impact of a group of undifferentiated changes. *Centex Bateson Construction Co.*, VABCA 4613, et al., 99-1 BCA ¶ 30,153, at 149,257.

> Cumulative impact is the unforeseeable disruption of productivity resulting from the 'synergistic' effect of an undifferentiated group of changes. Cumulative impact is referred to as the 'ripple effect' of changes on unchanged work that causes a decrease in productivity and is not analyzed

> in terms of spatial or temporal relationships. This phenomenon arises at the point the ripples caused by an indivisible body on two or more changes on the pond of a construction project sufficiently overlap and disturb the surface such that entitlement to recover additional costs resulting from the turbulence spontaneously erupts.

Id. at 149,258. Courts and boards have recognized that it is often the magnitude of the changed conditions that leads to the loss of productivity. *See, e.g.*, *Luria Brothers & Co. v. United States*, 369 F.2d 701, 707 (Ct. Cl. 1966); *States Roofing*, 10-1 BCA at 169,666 (finding "differing site conditions and multiple changes that permeated contract performance and impacted productivity").

All of the subcontractors assert labor inefficiency claims arising from hazardous material abatement, MEP interferences, and continuing design changes. Welch & Rushe also claims inefficiencies and delays attendant to limited site access and unforeseen security requirements. Smithsonian is responsible for the unexpected volume of hazardous material abatement, MEP interferences that were not depicted in the original drawings, and continuing design changes. Witnesses for Turner and each of the subcontractors testified persuasively that the associated delays and disruption caused them to resequence work. Each subcontractor spent time and effort on disruptive issues and "hopscotched" around to work in unaffected areas. Smithsonian is liable in principle for the labor inefficiency because it is responsible for the factors that caused the subcontractors to deviate from their plans.

2. Some of Turner's Subcontractors Proved Their Costs

"To prove [lost productivity or labor inefficiency], the contractor must show the normal or expected level of performance and must also show the extent to which the Government's action impacted that performance, reducing labor efficiency." *Stroh Corp.*, 96-1 BCA at 141,132.

> Impact costs are additional costs occurring as a result of the loss of productivity; loss of productivity is also termed inefficiency. Thus, impact costs are simply increased labor costs that stem from the disruption to labor productivity resulting from a change in working conditions caused by a contract change. Productivity is inversely proportional to the man-hours necessary to produce a given unit of product. As is self-evident, if productivity declines, the number of man-hours of labor to produce a given task will increase. If the number of man-hours increases, labor costs obviously increase.

Centex Bateson, 99-1 BCA at 149,257. A contractor bears the burden to prove by the preponderance of the evidence that a government action caused its labor pool to be less efficient than it planned and the extent of the impact. *Clark Construction Group*, 00-1 BCA at 152,412.

a. Measured Mile

Three of Turner's subcontractors, Stromberg, March Westin, and APRO, sought to prove their increased costs through a measured mile analysis. This method "permit[s] a comparison of the labor costs of performing work during different periods of time, so as to show the extent to which costs increase from a standard during periods impacted by certain actions." *Clark Concrete Contractors, Inc. v. General Services Administration*, GSBCA 14340, 99-1 BCA ¶ 30,280, at 149,746.

Stromberg proved its increased costs through its measured mile analysis. Stromberg performed the same type of work, HVAC ductwork installation, throughout the project. It identified a section of work that was not impacted by the problems that caused labor inefficiency, and compared its progress on that section to its remaining work on the project. Stromberg used its actual hours and costs to calculate its claim.

Smithsonian challenges Stromberg's choice of a measured mile, asserting that Stromberg did not choose work that was reasonably like or representative of the work on the rest of the project. Respondent's Brief at 76 (citing *J.A. Jones Construction Co.*, ENGBCA 6348, et al., 00-2 BCA ¶ 31,000). Smithsonian's argument is unavailing. Courts and boards have long recognized that "ascertainment of damages for labor inefficiency is not susceptible to absolute exactness." *Clark Concrete*, 99-1 BCA at 149,746; *Luria Brothers*, 369 F.2d at 712 ("[N]or does the impossibility of proving the amount with exactitude bar recovery for [loss of productivity]."). The Board will "accept a comparison if it is between kinds of work which are reasonably alike, such that the approximations it involves will be meaningful." *Clark Concrete*, 99-1 BCA at 149,747. That is true here. Turner may recover the claimed amount of $1,011,243.58 for the labor inefficiency Stromberg experienced on the project.

March Westin also proved its claim with a measured mile analysis. Mr. Calvey chose a measured mile that was less impacted than March Westin's other work and isolated the additional inefficient hours that March Westin spent on the project. He multiplied the hours by an average burdened labor rate to derive March Westin's claim.

Smithsonian challenges March Westin's choice of its baseline, arguing that March Westin's work prior to September 2007 was primarily steel preparation and fabrication, while the work after September 2007 consisted mainly of installation and field work,

precluding a fair comparison. Respondent's Brief at 83. We accept Mr. Calvey's explanation that he segregated the steel installation work prior to September 2007. Turner may recover the claimed amount of $909,361.28 for labor inefficiency March Westin experienced.

APRO sought but failed to prove its inefficiency costs with a measured mile analysis. It identified as its measured mile the demolition work it performed in October 2006, prior to the discovery of hazardous material. Smithsonian argues that APRO offered no evidence that the October 2006 period is a meaningful basis of comparison to the rest of the work. We agree. As APRO's president acknowledged, the scopes of work and manpower requirements for the demolition of each floor were different. APRO did not explain why these facts do not undercut its choice of a measured mile. On this basis, Turner cannot prevail on APRO's labor inefficiency claim.

b. MCAA Factors

Two subcontractors, Welch & Rushe and M.C. Dean, sought to prove their inefficiency claims using MCAA factors and other industry benchmarks. Welch & Rushe succeeded in part; M.C. Dean did not.

Lost productivity can be shown through application of general industry factors when causation is established but the impact cannot be quantified by another method, such as a measured mile. *Fire Security Systems, Inc*., VABCA 5559, et al., 02-2 BCA ¶ 31,977, at 158,001-02. Expert testimony on application of the factors must be supported by reliable empirical data. *See Herman B. Taylor Construction Co. v. General Services Administration*, GSBCA 15421, 03-2 BCA ¶ 32,320, at 159,904.

Welch & Rushe properly chose to use the MCAA factors because the nature of its work and the nature of the disruptions precluded a measured mile analysis. Welch & Rushe identified four factors and the severity of those factors based upon its experience with the project to calculate a 42% labor inefficiency factor. Based upon the testimony of Welch & Rushe witnesses, Welch & Rushe's choice of factors and determination of the severity of the factors was appropriate. To address defects in its own performance, Welch & Rushe reduced its total labor hours by 25% before applying the inefficiency rate. Smithsonian points out that Welch & Rushe failed to remove change order hours, both paid and pending. Respondent's Brief at 75. Because the Equitable Adjustment clause precludes labor inefficiency claims on changes, we adjust the claim to remove those hours, and Turner may recover $594,734 for Welch & Rushe's labor inefficiency claim.

M.C. Dean identified the last thirteen weeks of the project as its most inefficient period, based upon the increased labor hours and overtime. M.C. Dean witnesses testified

persuasively that crews become less efficient after working a series of sixty-hour weeks. Our difficulty comes with the calculation of the inefficiency. One witness testified that M.C. Dean consulted tables in industry publications to support a 34% inefficiency rate. M.C. Dean did not provide the industry publications or any expert testimony to support its application of this factor. "[T]he 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*, 369 F.2d at 713. Without evidentiary support, we cannot evaluate the appropriateness of the inefficiency factor and must deny Turner's claim on behalf of M.C. Dean on this basis.

c. Claims for Overtime Costs

M.C. Dean also seeks premium overtime costs that it incurred during this same period. Smithsonian correctly notes that, to recover, M.C. Dean must establish that Smithsonian did something that can be construed as an actual or constructive order to accelerate. Respondent's Brief at 62; *see States Roofing*, 10-1 BCA at 169,665. M.C. Dean does not point to an actual order to accelerate, and it cannot prove two of the five elements of constructive acceleration, namely, that it "encountered a delay that is excusable under the contract," or that Smithsonian "insisted on completion of the contract with a period shorter than the period to which the contractor would be entitled by taking into account the period of excusable delay, after which the contractor notified the government that it regarded the alleged order to accelerate as a constructive change in the contract." *Fraser Construction Co. v. United States*, 384 F.3d 1354, 1361 (Fed. Cir. 2004); *see also Fluor Intercontinental, Inc. v. Department of State*, CBCA 490, et. al., 12-1 BCA ¶ 34,989, at 171,964. Smithsonian extended the completion date to October 31, 2008, which was met. Smithsonian considered some of the extension compensable, and some only excusable. Neither Smithsonian nor Turner presented evidence of excusable delay that should have extended the completion date past October 31, 2008. Without such evidence, we cannot find constructive acceleration, or damages to M.C. Dean.[45]

[45] M.C. Dean's claim for overtime is predicated on the understanding that it incurred these costs to get the work done by October 31, 2008. The Board also heard testimony that asking for a contract extension would have been futile because Smithsonian had invited President Bush to open the SSB exhibit in November 2008. These arguments may have been sufficient to meet elements two and three of the *Fraser* test. But without an attempt by Turner and its subcontractors to prove excusable delay past October 31, 2008, the Board need not reach these points.

d. Total Cost Claims

Two subcontractors, Siemens and Southern, seek labor inefficiency costs using a total cost method, based on the differences between their actual costs and their bids.[46] These claims require proof of the same four elements as for total cost claims: "(1) the impracticability of proving its actual losses directly; (2) the reasonableness of its bid; (3) the reasonableness of its actual costs; and (4) lack of responsibility for the added costs." *Southern Comfort Builders, Inc. v. United States*, 67 Fed. Cl. 124, 146 (2005) (citing *Propellex Corp.*, 342 F.3d at 1339).

Siemens's claim fails because the one Siemens witness could not testify to element two, the reasonableness of Siemens's bid, which he did not prepare or even review in preparation for his testimony. In addition, the Board cannot determine whether Siemens's costs include the costs of pending change orders presented by Welch & Rushe and, therefore, cannot judge the reasonableness of its actual costs, element three.

Southern offered what it called a modified total cost claim, *see Southern Comfort*, 67 Fed. Cl. at 146, adjusted to account for a bid error and some hours spent on approved change orders. Southern's witness testified that it could not use another method to calculate labor inefficiency because its work was all over the project, and he explained the reasonableness of his firm's bid. While we credit this testimony, Southern's claim fails on the requirement to show that it is not responsible for any of its additional costs. Southern's witness offered no testimony on this point, and it would seem very difficult to prove, given Southern's position as a second-tier subcontractor. Smithsonian presented no evidence of performance issues for which Southern was responsible, but it points to numerous other performance difficulties of other subcontractors, for which Smithsonian is not responsible. The Federal Circuit's stringent test for total cost claims requires evidence ruling out causes other than Smithsonian's changes for Siemens's extra costs.

When rejecting a modified total cost claim for failure to meet one or more of the elements, boards have often resorted to a jury verdict approach for the determinations of damages. *See Luria Brothers*, 369 F.2d at 714; *States Roofing*, 10-1 BCA at 169,668. A jury verdict requires (1) clear proof of injury; (2) that there is no more reliable method for computing damages; and (3) evidence sufficient to make a fair and reasonable approximation of damages. *Dawco Construction, Inc. v. United States*, 930 F.2d 872, 880-82 (Fed. Cir. 1991), *overruled in part on other grounds by Reflectone, Inc. v. Dalton*, 60 F.3d 1572 (Fed. Cir. 1995) (en banc). Southern satisfies these elements. It

[46] Coakley also used the total cost method to quantify its claim, but, as the Board has already found, its claim is barred by the language of the release it signed for the overtime payments.

experienced lost productivity due to the same problems that other subcontractors experienced. It established that it could not use a measured mile to quantify its lost productivity. Finally, the Board accepts Southern's evidence of incurred costs as a basis for awarding damages. Accordingly, Turner may recover $49,069, 10% of Southern's actual adjusted costs.

D. Extended Overhead Claims

1. The Subcontractors Cannot Recover on Total Time Claims

Five of Turner's subcontractors also assert claims for extended overhead. Despite the subcontractors' assertions to the contrary, each of these is a total time claim—based purely on the difference in time between the planned completion date and the actual completion date. *See Bruno Law v. United States*, 195 Ct. Cl. 370, 382 (1971). Total time claims are disfavored because they hold the Government responsible for all delay. *1-A Construction & Fire, LLP v. Department of Agriculture*, CBCA 2693, 15-1 BCA ¶ 35,913, at 175,556. There is no showing that Smithsonian is responsible for the entire period of alleged delay. Moreover, Turner was paid under modification 26 for thirty-five days of delay. Neither Turner nor its subcontractors address whether the amount already paid was deducted from the subcontractors' total time claims.

2. Subcontractors Have Not Tied Their Claims to Critical Path Delay

Rejecting the total time claims does not end our inquiry. The Board could find the subcontractors entitled to some damages for delay if we found in the record periods of critical path delay that delayed the work of a particular subcontractor. *See Bruno Law*, 195 Ct. Cl. at 386; *Miles Construction*, VABCA 1674, 84-1 BCA ¶ 16,967, at 84,373 (1983). This requires evidence of delay to activities by the individual subcontractors, not just overall delay to the project. *Gulf Construction Group, Inc.*, ENGBCA 5964, 94-1 BCA ¶ 26,524, at 132,027 (1993). Of the five subcontractors with delay claims, however, only March Westin and Welch & Rushe attempted to tie their delay claims to a critical path analysis, and their evidence is insufficient to isolate critical path delay. March Westin's expert, Mr. Calvey, testified that some of March Westin's efforts were either on the critical path or delayed by predecessor activities on the critical path, but he also testified that March Westin experienced other, intermittent delays. Welch & Rushe's evidence consists of as-built schedules that do not show its work on the critical path.

March Westin also seeks extended home office overhead costs for the period that its work on the contract was extended, but it cannot recover these costs because it was not on standby and unable to get other work. *See Melka Marine, Inc. v. United States*, 187 F.3d 1370, 1375 (Fed. Cir. 1999). In fact, March Westin's project manager testified that

March Westin had so much work during the period of delay that it had to hire subcontractors for the Smithsonian project.

E. Claims for Additional Change Work

Turner presented claims for additional change work from five subcontractors. Welch & Rushe and Coakley made no threshold showing of liability. They did not provide sufficient evidence as to what the change work was, or what created the need for it.[47] Coakley has the additional problem that it did not include the changes in its claim to Turner (which was passed through to Smithsonian). Because the Board is not deciding this matter pursuant to its statutory authority, we do not find this omission a jurisdictional bar to Coakley's claim. However, we are left to wonder whether Coakley's changes claim was properly presented to the contracting officer, and we have no basis to determine how much Coakley may be owed.

Witnesses for the three other subcontractors testified about the work covered by the change orders and why they believed the costs were owed by Smithsonian.

Stromberg. Stromberg presented evidence on three change orders for overtime. The direction to work overtime came from Turner, not Smithsonian. Because Stromberg and Turner have not proven constructive acceleration by Smithsonian, Stromberg cannot recover its overtime costs. *States Roofing*, 10-1 BCA at 169,665.

With regard to its other change orders, Stromberg met its burden to establish that the additional work was caused by a change, and the costs of the change work. Stromberg's senior project manager testified persuasively regarding the nature of and need for each change. Smithsonian provided no substantive response. Turner may recover $128,784 for Stromberg's costs associated with these change orders.

M.C. Dean. M.C. Dean seeks the costs of three change orders. It failed to support its claimed costs for two of the change orders, for delays attributable to the security system contractor and the control system for the lights in the SSB exhibit. Regarding the third change order, for a speaker system, we find, based on the testimony of M.C. Dean's operations manager and the documentary evidence, that M.C. Dean did not establish that

[47] Welch & Rushe suggests that it did not attempt to testify in detail about each of its seventy-two changes because of the limited hearing time. Appellant's Brief at 38. Given the senior project manager's inability to testify as to the basic details of two of the three change orders about which he did testify, Welch & Rushe's assertion that the Board's time limits caused its failure to prove entitlement rings hollow.

the change work was a new requirement under the Smithsonian contract, rather than a requirement of Turner's original design.

March Westin. March Westin seeks the costs of four change orders. Its project manager explained how these change orders covered work required as the result of design changes or to provide additional structural support, and he provided supporting cost information. Smithsonian argues generally that these costs were incurred as the result of design errors for which Turner is responsible, but it does not specify any such errors. Turner may recover $82,007 for March Westin's additional change work.

March Westin also seeks its retainage on the contract. Smithsonian does not dispute that the retainage should be paid. *See EMS, Inc*., GSBCA 9588, et al., 90-2 BCA ¶ 22,876, at 114,892. Turner may recover $28,231 for March Westin's retainage.

IV. Smithsonian May Not Recover on Its Overpayment Claim

A. Smithsonian Bears the Initial Burden of Proof

As noted above, Smithsonian bears the burden on its claim for repayment to prove that it paid Turner more than was permitted by statute, regulation, or the contract. An exception to this rule applies to a challenge to cost reasonableness, as opposed to allowability. Although the Government must "challenge" the reasonableness "of a specific cost," once it does "the burden of proof [shifts to] the contractor to establish that such cost is reasonable." 48 CFR 31.201(a) (FAR 31.203-3) (2015); *Kellogg, Brown & Root Services, Inc. v. United States*, 728 F.3d 1348, 1363 (Fed. Cir. 2013).

Smithsonian bases its claim on the Audit clause of the contract, which gives Smithsonian the right to audit Turner's books and records and to seek repayment of an "overpayment" (which the clause does not define), and on the allowability principle of FAR 31.201-2, which requires that costs incurred under cost-type contracts be reasonable, allocable to the work, and consistent with the contract and law. FAR 31.201-2(a); *e.g*., *URS Energy & Construction, Inc. v. Department of Energy*, CBCA 2260, 12-2 BCA ¶ 35,094, at 172,353. Smithsonian's auditor, Mr. DuVal, attempted to tie each category of costs he questioned either to a provision of the contract or to the allowability standard.

Smithsonian also relies heavily upon *JANA, Inc. v. United States*, 936 F.2d 1265 (Fed. Cir. 1991), in which the contractor's costs were disallowed when it could not produce supporting documentation. *Id*. at 1267. In *JANA*, the contract specifically required the contractor to maintain records to substantiate its charges. *Id*. at 1267-68. It was undisputed that the contractor could not produce the required records. *Id*. at 1267. On this basis, the Federal Circuit determined that the contractor was overpaid for hours it

could not support. *Id*. We do not find the same situation here. Although Mr. DuVal attempts to cast his audit results as questioning unsupported amounts, neither he nor Smithsonian has identified requirements of the contract—which was not awarded as a cost-type contract—that require repayment of the amounts sought. Moreover, the Audit clause requires that Turner maintain records in accordance with "generally accepted accounting principles and practices," a standard Turner met.

B. Smithsonian Is Not Entitled to Repayment of Questioned Amounts

1. Turner's Sole-Source Contract Expenditures Were Reasonable

Mr. DuVal questioned the reasonableness of the costs Turner expended for forty contracts solely because these contracts were awarded on a sole-source basis. As a preliminary matter, we note that the FAR reasonableness standard applies to cost-type contracts and to changes under fixed-price contracts. We doubt, but need not decide, whether it applies full-force to Turner's quantum meruit claim to definitize the price of the base contract.

Under FAR 31.201-3, "a cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person in the conduct of competitive business." Whether this standard is met for a particular expense depends on "all the factual circumstances." *Mission Support Alliance, LLC v. Department of Energy*, CBCA 4985, 16-1 BCA ¶ 36,540, at 178,015.

Smithsonian offers no evidence that Turner paid more than it should have for the items it procured from sole sources. Smithsonian appears to take the position that the costs were not reasonable because they were not the product of "arm's length bargaining." Turner's witnesses established that the subcontracts satisfied the reasonableness test.[48] Turner followed its corporate procurement policies and obtained the approval of its senior vice president for many of the subcontracts. Experienced Turner employees evaluated the reasonableness of the procured items. Finally, while FAR 31.201-3 does require that "particular care" be taken to examine costs incurred in connection with separate divisions of firms that "may not be subject to effective competitive restraints," the Board sees no issue with the purchases made by Turner Logistics. As explained by Turner's witnesses, Turner Logistics made the purchases

[48] Smithsonian asserts that this reasonableness test cannot be met by testimony from Turner witnesses in the "heat of litigation." Respondent's Brief at 106. Much of this testimony would not have been necessary if Smithsonian had asked Turner about the contracts and items purchased on a sole-source basis prior to making its demand for repayment.

using competitive procedures, and the purchases were approved by Smithsonian early in the contract. Even if Smithsonian's identification of sole-source contracts sufficed to shift the burden to Turner, Turner has established the reasonableness of the payments on sole-source subcontracts, and the claim for repayment fails.

In post-hearing briefing, Smithsonian argued for the first time that Turner did not obtain Smithsonian's approval for the sole-source subcontracts, as the contract required. Respondent's Brief at 104. The clause Smithsonian cites is contained in the provisions regarding design documents and is inapplicable to the vast majority of the sole-source dollars expended by Turner, which were mostly for construction work. Moreover, the sole-source contracts for design items—the abstract flag and barrisol ceiling—were specifically requested by Smithsonian.

2. Smithsonian Is Not Entitled to Repayment of Costs of T&M Subcontracts

Mr. DuVal questioned the costs of Turner's T&M subcontracts because he was not provided sufficient documentation to verify them. We see nothing in either the Audit clause or the T&M provisions in the FAR requiring Turner to maintain records to allow Mr. DuVal to perform this reconciliation. Smithsonian also cites to the Defense Contract Audit Agency Audit Manual, specifically DCAM 6-1008(b)(8), as support for its position that an invoice hour reconciliation was necessary for the audit. Respondent's Brief at 95. However, DCAM 6-1008 applies to vouchers submitted directly to the auditor under a cost-reimbursement contract, and does not apply to T&M contracts or to changes under a fixed-price contract. We also credit Mr. McGeehin's testimony that the invoice hour reconciliation that Mr. DuVal wished to do was not a generally accepted practice. There is no basis for repayment.

3. Smithsonian Is Not Entitled to Repayment of Change Order Costs

Similarly, Mr. DuVal questioned more than $18 million in change order costs because Turner could not produce daily work tickets. Smithsonian argues that it is entitled to repayment under the Audit clause, because Turner did not comply with the Equitable Adjustment clause, which requires the retention of daily work tickets for change order work. The Equitable Adjustment clause, however, imposes this requirement only for work that the contracting officer elects to have performed on a time and materials basis. Smithsonian did not show that it made that election here. Instead, Smithsonian argues that the provision applies to any changes ordered by Turner, by virtue of the flowdown provision of the contract. The flowdown provision cannot be read that broadly. It required Turner to impose upon its subcontractors the requirements that

Smithsonian placed on Turner, but it did not put Turner in the shoes of the contracting officer when it chose to award time and materials subcontracts.

Neither of the decisions Smithsonian relies upon supports its claim. One, *United States v. Lockheed Martin Corp.*, 282 F. Supp. 2d 1324 (D. Fla. 2003), was a defective cost and pricing case arising under the Truth-In-Negotiations Act. The other, *Analytical Assessments Corp.*, ASBCA 52393, et al., 01-2 BCA ¶ 31,483, is factually distinguishable, as the contractor in that case presented no evidence of the accounting procedures behind its invoices. *Id.* at 155,426. Turner produced reliable supporting documentation, explained by the hearing testimony, for its change order costs, just not the documentation that Smithsonian's auditor wanted. We find no basis for repayment of $18 million or any amount.

4. Smithsonian Is Not Entitled to Credits

Smithsonian seeks repayment of costs totaling $679,547 that Mr. DuVal concluded, based solely upon project documentation, should be credited to Smithsonian because they are not allocable to the contract. His analysis was unpersuasive. Allocability is an accounting concept that requires "a sufficient 'nexus' . . . between the cost and a government contract." *Boeing North American, Inc. v. Roche*, 298 F.3d 1274, 1281 (Fed. Cir. 2002). Smithsonian appears to argue, although not in so many words, that these costs are not allocable because they are related to design issues and other difficulties that were Turner's contractual responsibility. Mr. DuVal applied no technical expertise to conclude that these costs were owed to Smithsonian, nor did he discuss the issues with knowledgeable Smithsonian or Turner personnel. At most, the document upon which he relied, which was not an accounting record, may have raised questions that could have been pursued. Smithsonian presented no other analysis of the design or interference issues that Mr. DuVal identified. It did not meet its burden.

5. Smithsonian Is Not Entitled to Repayment of Excessive Indirect Change Order Costs

Mr. DuVal identified a total of $894,921 in subcontractor change order costs that he asserted were "mischarged" because they exceeded the limits on indirect costs in the Equitable Adjustment clause. As noted above, however, we cannot trace the examples cited in Smithsonian's post-hearing brief to Mr. DuVal's report, which is the basis for Smithsonian's claim. Moreover, Smithsonian failed to discuss these issues with Turner and confirm that the amounts exceeded the limits of the clause. We deny relief.

6. Smithsonian Proved No Other Excess Payments

Finally, Smithsonian seeks costs that it has paid Turner, but it believes Turner has not incurred, based upon notations in Turner's accounting system. The first set are costs listed as due and owing on Turner's ledger, but not yet paid to subcontractors. Smithsonian does not deny that these costs were invoiced and properly recorded under the accrual method, but argues that Turner has not paid them, and might not be required to. Turner's project manager and Mr. McGeehin both testified that Turner will pay these amounts. Based upon this testimony, we find no basis for Smithsonian's claim. The second set of costs are insurance and bond costs associated with Turner's claim. We similarly have no doubt that these amounts will be paid as awarded in this decision.

Decision

Turner's appeal of the contracting officer's first decision (CBCA 2862) is **GRANTED IN PART**. Turner may recover $5,514,400, plus interest calculated from May 24, 2011. Turner's appeal of the contracting officer's second decision (CBCA 4085) is **GRANTED**. Smithsonian may not recover any of the amounts for which it seeks repayment. Turner's appeal of the contracting officer's third decision (CBCA 4802) is **GRANTED**. Turner may recover $438,668, plus interest calculated from May 6, 2015.

MARIAN E. SULLIVAN
Board Judge

We concur:

H. CHUCK KULLBERG
Board Judge

KYLE CHADWICK
Board Judge