In the United States Court of Federal Claims

No. 03-1613C

(Filed: April 21, 2008)

BELL BCI COMPANY, Plaintiff, v. THE UNITED STATES, Defendant.	Building Construction; Cumulative Impact/Labor Inefficiency Claim; Effect of Multiple Changes on Unchanged Work; CPM Schedule Analysis; Delay Damages; Accord and Satisfaction; Liquidated Damages.

Richard O. Wolf, with whom were *Charlie C.H. Lee, Robert D. Windus*, and *Kristen A. Bennett*, Moore & Lee, LLP, McLean, Virginia, for Plaintiff.

Kyle Chadwick, with whom were *Joan Stentiford-Ulmer*, Trial Attorney, *Jeffrey S. Bucholtz*, Acting Assistant Attorney General, and *Jeanne E. Davidson*, Director, United States Department of Justice, Commercial Litigation Branch, Civil Division, Washington, D.C., for Defendant.

OPINION AND ORDER

WHEELER, Judge.[1]

This case arises from the construction of a laboratory building at the National Institutes of Health ("NIH") in Bethesda, Maryland. Approximately nine months into construction, NIH decided to add a new floor to the building. NIH issued more than 200 contract modifications that delayed the completion of the project by 19-1/2 months, and increased the contract price by $21.4 million, or 34 percent. The prime contractor, Bell BCI Company ("Bell"), has received payment for performing most of the changed work, but

[1] This case was transferred to Judge Thomas C. Wheeler on June 1, 2006, pursuant to Rule 40.1(b) of the Rules of the Court of Federal Claims.

asserts an impact claim for the cumulative effect of the changes on Bell's overall performance. Bell also asserts "pass through" impact claims on behalf of five subcontractors who worked on the project. Defendant contends that Bell's claims are barred by the doctrine of accord and satisfaction, and that Bell is liable for $447,678 in liquidated damages for failing to finish the project on time. The Court has jurisdiction of this matter pursuant to the Tucker Act, 28 U.S.C. § 1491(a)(1), and the Contract Disputes Act ("CDA"), 41 U.S.C. § 609(a). In an earlier decision, the Court denied the parties' cross-motions for summary judgment on the accord and satisfaction issue. Bell BCI Co. v. United States, 72 Fed. Cl. 164, 169 (2006).

Bell claims damages of $6,200,672, plus CDA interest under 41 U.S.C. § 611, from April 5, 2002 until the date of payment. Bell's claims consist of: (1) $563,125 as the unpaid balance of the contract price; (2) $1,610,987 for unresolved changes; (3) $1,602,053 for the delays of remaining on the project after April 30, 2001; (4) $2,058,456 in labor inefficiency costs attributable to the cumulative impact of the changes; and (5) $366,051 as a 10 percent profit on the delay and labor inefficiency costs. In addition, the five subcontractor claims total $1,690,352.

The Court conducted a six-day trial in Washington, D.C. during October 15-22, 2007. The witnesses in order of appearance were: Thomas Bell, Bell's chief executive officer; Jeremy Bardin, Bell's project manager; William Rothrock, Bell's mechanical project manager; Patrick Brannon, Bell's expert; Timothy Bussey, William Engle, and Richard Freeman, witnesses for a subcontractor, Stromberg Metal Works, Inc.; Brian Temme, project manager for NIH's construction quality management firm; Ted Scott and Colin Daigle, Defendant's experts; and Frank Kutlak, the NIH contracting officer's technical representative. The Court also received rebuttal testimony for Bell from Mr. Bardin and Mr. Brannon. The parties filed post-trial briefs on December 31, 2007, and reply briefs on January 22, 2008. The Court heard closing arguments on March 4, 2008.

In brief summary, the Court finds in favor of Bell, and awards damages of $6,200,672, plus CDA interest. The record shows that NIH, despite its best intentions, lost control of the project beginning in September 2000, and could not prevent the scientists who would occupy the building from demanding changes. The addition of a new floor after construction had begun proved to be a disastrous idea, particularly in causing many mechanical and electrical changes after the work already had been installed. As changes and delays mounted, NIH and its quality management firm only made matters worse by directing Bell to perform extra work without time extensions, or authorizing Bell to accelerate performance. In issuing 200-plus contract modifications, NIH actually addressed more than 730 Extra Work Orders ("EWOs").

Defendant's accord and satisfaction defense is without merit. None of the contract modifications included any payment to Bell for cumulative impact or labor inefficiency. Bell did not expressly release its cumulative impact claim in any modification. Defendant relies on release language in Modification 093, dated October 2, 2000, to support its position, but the release language does not address cumulative impact claims. Moreover, Modification 093 preceded many of the events giving rise to the claim. As described in the Court's earlier decision in this case, Modification 093 is not a model of clarity. See Bell, 72 Fed. Cl. at 168-69. Defendant could have called the Contracting Officer, Barbara Taylor, to explain whether and on what basis Modification 093 included a release of Bell's cumulative impact claim, but despite being included on Defendant's witness list, Ms. Taylor did not testify. The Court infers that, if Ms. Taylor had testified, her testimony would have been unfavorable to, or at least would not have supported, Defendant's position. See Day & Zimmermann Servs., Inc. v. United States, 38 Fed. Cl. 591, 603-04 (1997); Hageny v. United States, 215 Ct. Cl. 412, 570 F.2d 924, 935-36 (1978); see also Borror v. Herz, 666 F.2d 569, 573-74 (C.C.P.A. 1981).

The expert schedule analysis presented at trial overwhelmingly shows that the delays encountered by Bell were caused by the NIH changes, entitling Bell to a time extension through the date of project completion. Bell's expert reached this conclusion after analyzing just 49 of 184 EWOs selected for review. Although Defendant criticized Bell's analysis as being a "theoretical approach" (Deft.'s Brief at 21), Defendant did not demonstrate that any portion of Bell's analysis was incorrect. Even if some inaccuracies had been shown, the many additional EWOs not even analyzed would have further established Bell's entitlement to a time extension. The Court cannot ignore that Bell used the type of schedule analysis that NIH mandated in the Contract.

The Court also grants the "pass through" claim of Stromberg Metal Works, Inc. in the amount of $812,092, plus CDA interest. The claims of the other subcontractors are denied because Bell did not submit specific evidence in their behalf, and none of them appeared to testify at trial. Although Bell included the subcontractor claims in the record, the Court concludes that the burden of proof requirements for these claims were not satisfied.

There is evidence that NIH failed to satisfy its implied duty of good faith and fair dealing in the administration of this project. NIH asserted a liquidated damages claim against Bell knowing that such a claim lacked a factual basis. NIH lodged this claim only to gain negotiating leverage after Bell submitted a request for equitable adjustment. Further, NIH's quality construction manager recanted the Contracting Officer's approval of various extra work items after Bell had completed the extra work. As the Court recently observed in a similar setting, "a contracting officer's review of certified claims submitted in good faith is not intended to be a negotiating game where the agency may deny meritorious claims to gain

leverage over the contractor." Moreland Corp. v. United States, 76 Fed. Cl. 268, 292 (2007). The same principle applies where the agency asserts an unfounded liquidated damages claim solely to gain negotiating leverage. A breach of the implied duty of good faith and fair dealing here, however, would not alter the outcome of the case, as Bell's damages would be the same with or without such a finding. Accordingly, the Court need not address further the issue of NIH's questionable conduct.

Findings of Fact[2]

A. Project Background

On March 26, 1998, Bell entered into Contract No. 263-98-C-0102 ("the Contract") with NIH to construct a new laboratory known as Building 50 on the NIH campus in Bethesda, Maryland. (PX 5; Stip. 1, 7, 10).[3] The parties agreed to a fixed price of $63,663,745, and a completion date of 821 calendar days after notice to proceed. (Stip. 9; PX 5 at A-2, F-1; PX 708). NIH issued the notice to proceed on April 1, 1998, and thus the original completion date was June 29, 2000. (Stip. 9). The Contract contained a "Liquidated Damages" clause providing that Bell would pay $3,721 for each day of delay in failing to meet the completion date. (PX 5 at F-1).

As originally designed, the building was to have five stories and a full basement area, consisting of approximately 23,040 square meters of finished office and laboratory space, including 2,788 gross square meters of laboratory animal holding areas. (Stip. 10). Ultimately, the building had six stories and a full basement, totaling approximately 27,363 square meters of finished office and laboratory space. The building accommodated approximately 650 scientists from nine NIH institutes. (Stip. 11).

NIH retained other firms to assist on the project . An architectural firm, HLM Design, prepared the plans and specifications, and thus Bell had no design responsibility for the project. (Stip. 2; Bell, Tr. 216; Kutlak, Tr. 1242). NIH retained CRSS Constructors, Inc., later acquired by Jacobs Facilities, Inc., to be the construction quality manager. (Stip. 3).

---

[2] This statement of the facts constitutes the Court's principal findings of fact under Rule 52(a) of the Court. Other findings of fact and rulings on mixed questions of fact and law are set forth in the later analysis.

[3] In this opinion, the Court will refer to the trial transcript by witness and page as "Name, Tr. __," and to trial exhibits as "PX __" for Plaintiff's exhibits, and "DX__" for Defendant's exhibits. The parties' pretrial stipulations of fact, filed on July 19, 2007, are referred to as "Stip. __." For lengthy exhibits, page citations also are included.

CRSS served as NIH's "eyes and ears" on the project. Id. Brian Temme of CRSS was principally responsible for providing these services to NIH. (Temme, Tr. 1008). Barbara Taylor was NIH's Contracting Officer. Mr. Temme, however, drafted much of the correspondence that NIH sent to Bell with the Contracting Officer's signature. (Temme, Tr. 1014).

The Contract contained the standard "Changes" clause for construction contracts specified in Federal Acquisition Regulation ("FAR") ¶ 52.243-4 (AUG 1987). (PX 5 at I-20). Based upon its years of construction experience with NIH and other federal agencies, Bell anticipated that project changes would be in the range of 5-10 percent of the contract value. (Bell, Tr. 241-42).

The specifications called for Bell to maintain a project schedule, and to keep track of the progress of the work, as follows:

> The Contractor shall provide, operate, and maintain a computerized Project Schedule using the Critical Path Method (CPM) to plan and schedule the execution of the work, to assist the Contracting Officer in appraising the reasonableness of the schedule, to evaluate the progress of the work, to make progress payments, and to make decisions relative to time and/or cost adjustments which may result from changes in the work.

(PX 6, Contract Specifications, Section 1310, ¶ 1.02A). The specifications also required Bell to submit a time impact analysis within seven days of encountering a delay or receiving a notice to proceed with changed work, if Bell proposed a time extension. Id. at ¶ 7.01B-C. The parties agreed, however, that "special circumstances" could excuse the time limits that otherwise would apply for submission of a time extension request. (PX 5 at H-24; Stip. 13).

Bell and NIH followed certain procedures for processing changes to the project. Whenever NIH wanted to change the project design or correct a design error, it would issue a Change Bulletin asking Bell to submit a proposed price to perform additional work. In response, Bell would submit an EWO to perform the additional work. If accepted, NIH would issue a change order, and the parties would execute a contract modification setting forth the change and the agreed upon price. (Stip. 15). The Contract did not obligate Bell to perform additional work until NIH issued a change order. In practice, to avoid delays, the parties agreed that Bell could begin performing additional work without waiting for NIH's execution of a change order. (Stip. 16).

Bell began performance of the Contract on April 1, 1998. (Bardin, Tr. 275). From April through December 1998, Bell performed the work in a timely manner. During this period, NIH made relatively few changes to the Contract work. As of December 31, 1998, the project was 13 days ahead of schedule. (Stip. 17).

B. NIH's Decision to Add a New Floor

In mid-December 1998, with construction well under way, NIH determined that it had a budget surplus for the project of approximately $15,600,000. (Stip. 18). NIH examined the possibility of using the surplus funds to add a new floor. NIH believed that it could increase Building 50's usable area by 15 percent, and change the structure from five to six stories. Id. NIH estimated that it could add the new floor for a cost of $10,962,475. (PX 15). This amount consisted of Bell's estimate to perform the work of $10,230,131, plus three months of NIH's additional project costs. (Temme, Tr. 1002-04; PX 15). NIH recognized the risk that the new floor could be "too ambitious a proposal that if pursued could turn . . . a successful project into a problem project." (PX 18 at 4).

After its internal assessment, NIH notified Bell that it was contemplating the addition of a new floor to be inserted above the original third floor. NIH advised Bell that it would decide whether to add the new floor by January 31, 1999. (Stip. 20). NIH gave Bell a "Feasability Study" for the new floor. (PX 13). NIH represented to Bell that the new floor would be a duplicate of the third floor. (Bell, Tr. 222; PX 13; Stip. 22-24). Based upon the information provided, Bell proposed a 92-day time extension for the new floor addition, which NIH considered "fair and reasonable." (PX 15 at 2). On January 22, 1999, the Director of NIH approved the construction of the new fourth floor. (Stip. 28).

Negotiations between Bell and NIH for the new floor proceeded in three phases. (Stip. 29). The first negotiation phase involved the structural steel and concrete work. Id. On April 20, 1999, the Contracting Officer approved Modification 005 establishing a price of $1,579,127 for the fourth floor structural work, and extending the Contract completion date by 30 days to July 29, 2000. (Stip. 30; PX 712).

The second negotiation phase involved changes to the fourth floor that NIH made after Bell submitted its price proposal. (Stip. 29). NIH issued Change Bulletins 6, 7, and 10 on February 16, 1999, followed by Change Bulletin 3 on March 2, 1999. (Stip. 31). Change Bulletin 3 contained a partial infrastructure or "shell" design for the fourth floor. Id. On March 29, 1999, NIH directed Bell to proceed with the changes set forth in Change Bulletins 3, 6, 7, and 10. (Stip. 32). On June 23, 1999, the Contracting Officer approved Modification 024 establishing a price of $6,891,118 for the phase two added work, and extending the Contract completion date to August 29, 2000. (Stip. 33; PX 731).

The third negotiation phase began on September 30, 1999, when NIH issued Change Bulletin 35, containing the final design plans for the new floor. (Stip. 34). On February 11, 2000, Bell submitted EWO 240 for completing the "fit out" work identified in Change Bulletin 35. (Stip. 35). Bell stated in EWO 240 that certain identified work therein "has occurred" and that "[a] time extension of 90 days was previously agreed to with the government for the added work." Bell also stated that "[t]his proposal include[s] the final 30 days of extended overhead agreed for the added floor only." Id. NIH did not accept EWO 240. Id. Instead, on April 14, 2000, NIH issued unilateral Modification 078. (Stip. 36). In this modification, NIH directed Bell to proceed with the specified work at a price of $1,803,037, pending further negotiation. (PX 785). NIH extended the Contract completion date by another 30 days, to September 28, 2000. Id. Bell proceeded with this work in accordance with NIH's direction. (Stip. 36).

C. Modification 093

By August 2000, Bell and NIH knew that the existing completion date of September 28, 2000 could not be met. (Bardin, Tr. 315). Bell and NIH held a meeting to address the fit-out costs of the new floor, and the schedule impact of prior NIH changes. During this meeting, NIH represented to Bell that few additional changes would be issued, and that NIH would pay Bell to perform these changes on an accelerated basis. (Bell, Tr. 230; Bardin, Tr. 317-19; Temme, Tr. 958, 1027; Kutlak, Tr. 1221-22). NIH also asked Bell to agree to a series of new interim completion dates that would allow NIH to begin occupying the building on a phased basis. A phased occupancy would allow NIH to move its personnel from other buildings that were scheduled for construction renovation. (Temme, Tr. 1028-29; PX 83 at 15).

Bell and NIH executed Modification 093 on October 2, 2000. (Stip. 37; PX 39). In this modification, referencing EWO 240-R1, the parties agreed to a price increase of $2,296,963, and a revised completion date of April 30, 2001.[4] (PX 39). The parties also established 14 substantial completion milestones between October 1, 2000 and April 30, 2001, and changed the liquidated damages amount to $266 per calendar day for contractor delays in meeting any of the 14 milestone dates. (Stip. 37; PX 39 at 2). The new daily rate, $266, was simply the original daily rate, $3,721, divided by 14, and rounded to the nearest dollar. (PX 39 at 2).

[4] The first page of Modification 093 states that the new completion date is April 15, 2001, but the second page states with reference to the milestone schedule that the completion date is April 30, 2001. (PX 39). The Court accepts April 30, 2001 as the intended date. This new date represented a 214-day time extension.

The modification states that its purpose is "to modify the contract and to provide an equitable adjustment for changed work as itemized on the following page of this modification." (PX 39 at 1). The modification further states in paragraph 4 that the parties mutually agreed to:

> Increase the contract amount by $2,296,963 ($4,100,000 – $1,803,037 from Mod 7[8]) as full and equitable adjustment for the remaining direct and indirect costs of the Floor 4 Fit-out (EWO 240-R1) and full and equitable adjustment for all delays resulting from any and all Government changes transmitted to the Contractor on or before August 31, 2000.

(PX 39 at 2). The modification contained in paragraph 8 the following release language:

> The modification agreed to herein is a fair and equitable adjustment for the Contractor's direct and indirect costs. This modification provides full compensation for the changed work, including both Contract cost and Contract time. The Contractor hereby releases the Government from any and all liability under the Contract for further equitable adjustment attributable to the Modification.

(PX 39 at 3). Modification 093 does not contain any mention of a cumulative impact or inefficiency claim. Bell did not receive in Modification 093 any consideration for the settlement or release of a cumulative impact or inefficiency claim. (Bell, Tr. 234). The Contracting Officer, Barbara Taylor, signed Modification 093 on behalf of NIH. (PX 39 at 1).

D. NIH Changes After August 31, 2000

After the parties signed Modification 093, NIH requested the architect to minimize changes. In an October 9, 2000 letter to HLM Design, Mr. Temme and Mr. Kutlak jointly stated:

> Attached please find the Modification No. 93 text addressing the project completion schedule. This revised completion schedule incorporates the time impact of all changes issued to Bell on or before August 31, 2000. It does not incorporate changes after that date, and it is therefore incumbent on the Government's team to minimize change.

(PX 39A at 1). Similarly, Mr. Temme advised NIH personnel that "[s]ince the terms of the revised schedule are favorable to NIH, it is essential that we not make any changes to the Bell contract, because change orders potentially jeopardize completion dates." (PX 65, NIH minutes, Oct. 12, 2000, ¶ 1.B.5). Four weeks later, Mr. Kutlak stated to NIH personnel that "[s]ince we are pushing Bell to maintain schedules, there can be no more changes." (PX 65, NIH minutes, Nov. 9, 2000, ¶ 1.B.1).

Contrary to these assertions, however, NIH issued 113 additional modifications after the parties signed Modification 093. (PX 801-912). These modifications incorporated 216 EWOs. (PX 94B at 48). Mr. Kutlak informed NIH personnel on January 11, 2001 that "[t]here are about (250) extra work orders pending and another (200) anticipated." (PX 65, NIH minutes, Jan. 11, 2001, ¶ 1.B.1). Mr. Kutlak explained that "[a]s important as the changes may be to the scientific community, we cannot continue to implement them." Id. Despite intending to control changes, the NIH project team had no ability to stop the NIH scientists from making changes. (Bell, Tr. 236-37; Kutlak, Tr. 1234). NIH directed Bell to perform additional work without impact to the project schedule. (Bell, Tr. 264; Bardin, Tr. 324-25).

By letter dated November 20, 2000, Bell notified Mr. Temme that NIH's continued issuance of changes could delay the project and impact Bell's ability to meet the completion milestones. Bell also stated that when NIH issued directives for additional work, the only way to avoid impact to the schedule was for NIH to authorize the resources to accelerate performance. Bell advised that, even with an acceleration effort, the completion milestones might not be achieved. (PX 41; Bardin, Tr. 326-30). NIH did not authorize an acceleration effort, and did not respond to Bell's letter. When Bell attempted to include acceleration costs in its EWOs, NIH struck them out. (Bardin, Tr. 331).

On January 24, 2001, knowing that 250 EWOs were pending and that 200 more were anticipated, NIH decided to withhold $100,000 in payments to Bell "due to inadequate progress." (PX 44 at 2; Temme, Tr. 1035). On February 20, 2001, Bell notified NIH that its failure to negotiate changes in a timely manner was causing a cash flow problem, because NIH was forcing Bell to finance the cost of performing changes until NIH made payment. (Bardin, Tr. 335-38, 341-42; PX 48). NIH repeatedly asserted its right to assess liquidated damages if the milestone completion dates were not met. Bell also stated that it was reserving all rights. (Bardin, Tr. 343-44; PX 56, 859). Relationships between the parties became strained as NIH continued to issue changes, demanded compliance with the milestone completion dates, and refused to authorize Bell to accelerate performance. NIH would not extend the schedule, and even reneged on paying Bell for changes that had been negotiated and accepted by the Contracting Officer. (Bardin, Tr. 343, 357-62; PX 187, 218, 219).

Between October 2, 2000 and April 5, 2001, the parties entered into Modification Nos. 94-140. None of these modifications provided Bell with any compensation for cumulative impact or inefficiency costs. NIH compensated Bell only for the direct costs of the change. (PX 801-47).

Bell substantially completed the project, including all of the changed work, on February 8, 2002. (Bell, Tr. 237-38; Brannon, Tr. 585). On April 5, 2002, Bell submitted a certified Request for Equitable Adjustment ("REA") to the NIH Contracting Officer, Barbara Taylor. (PX 71; Stip. 40). On July 1, 2002, the Contracting Officer denied the claim in its entirety, and asserted NIH claims against Bell for liquidated damages of $481,726, credits due the Government of $121,000, costs of retests of $61,399, and estimated costs of outstanding major deficiencies of $213,500. (PX 73 at 7). Bell filed its complaint in this Court on June 27, 2003. (Stip. 43). Defendant continues to assert a liquidated damages claim for the reduced amount of $447,678, but has dropped its other backcharge claims. Deft.'s Brief at 2, 28.

The adjusted Contract price at completion was $85,048,515. (Stip. 46). After 206 modifications, the adjusted Contract price was $20,821,645 higher than the original price. NIH paid Bell a total of $84,485,390 under the Contract. (Stip. 45). The unpaid Contract balance is $563,125. (Stip. 47).

E. Expert Schedule Analysis

Bell presented Patrick Brannon as an expert in Critical Path Method ("CPM") scheduling, delay and impact analysis, labor productivity analysis, construction costs and damages estimating, construction cost accounting, and contract administration. (Brannon, Tr. 566). Mr. Brannon is the President of Oxley & Brannon Construction Consultants, Inc., in St. Petersburg, Florida. He is a licensed professional engineer and a general contractor in Florida. (Brannon, Tr. 547, 552; PX 94A). Mr. Brannon has analyzed "hundreds" of construction schedules, focusing on time extension requests and delays. (Brannon, Tr. 560-61).

Mr. Brannon based his analysis on interviews of project participants, and his review of project records, including the CPM schedule and updates, the contract plans and specifications, the EWOs, the requests for information ("RFIs"), contract modifications, and Bell's request for equitable adjustment. (Brannon, Tr. 570-72, 576-77, 709).

In accordance with Contract Specification Section 1310, Mr. Brannon used a time impact analysis to determine Bell's entitlement to time extensions. (PX 6, Contract Specifications, Section 1310, ¶ 7.01A-B). Mr. Brannon examined the impact of the NIH

changes on Bell's CPM schedule updates. (Brannon, Tr. 642). In determining whether Bell was entitled to a time extension, Mr. Brannon employed a conservative approach. He considered only EWOs that were generated from NIH changes issued after August 31, 2000. He excluded all of the disputed EWOs that NIH has not acknowledged as a change, as well as any EWO where Bell had not expressly reserved its rights. In total, Mr. Brannon analyzed 184 EWOs. (Brannon, Tr. 670-71; PX 94 at 26; PX 94B at 102).[5] After examining an initial 49 EWOs that caused a delay to one or more milestone completion dates, Mr. Brannon concluded that Bell was entitled to a sufficient time extension to account for all of the project delays. (Brannon, Tr. 672; PX 94 at 26-27). The details of his schedule analysis are described below.

1. September 1, 2000 Schedule Update

During September 2000, NIH issued one change, documented in EWO 465, that delayed the Contract's substantial completion milestone. (PX 94 at 33-38). Bell's Schedule Update N127 was the first schedule to incorporate the milestone completion dates established in Modification 093. Id. EWO 465 involved a modification to conform to the National Electric Code, and to approve an offset in the placement of lights in basement shower stalls due to potential interferences with vertical exhaust duct drops. (PX 94 at 33-37; PX 343-345). The change originated on September 6, 2000 following a walk-through with a CRSS representative. (PX 343). Bell submitted an RFI on September 7, 2000, and CRSS answered the RFI on September 13, 2000. Id. CRSS asked Bell to move light fixtures in the large shower stalls, but to relocate exhaust ducts in small shower stalls so the light fixture would remain in the center of the stall. Id. Mr. Brannon used the September 20, 2000 notice to proceed date as the starting point of his analysis. (PX 94 at 36).

Mr. Brannon created a "fragnet"[6] of the work involved in EWO 465, and inserted it in Schedule Update N127. The fragnet showed an impact to activities affecting six of the milestone dates. The resulting delays, however, did not move the dates past the Contract-specified dates except for the Contract completion milestone. (PX 94 at 34-38; PX 94B at 103-12, N127 Schedule). The work associated with EWO 465 resulted in a 23-day delay to the Contract's substantial completion date. This milestone slipped from an early completion date of April 24, 2001 to May 17, 2001, putting the project completion 17 calendar days behind schedule. (PX 94 at 37).

---

[5] Mr. Brannon's expert report, dated September 9, 2004, is Plaintiff's exhibit 94, and his set of demonstrative charts used at trial is Plaintiff's exhibit 94B.

[6] In CPM scheduling, a "fragnet" is a subset of the activities in the project schedule affected by a delay.

2. October 1, 2000 Schedule Update

During October 2000, NIH issued changes that delayed nine intermediate schedule milestones, and the Contract's substantial completion milestone. (PX 94 at 38-63). Mr. Brannon analyzed EWO Nos. 461, 511, 478, 639, 483 and 484, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update N128 for October 1, 2000. (PX 94 at 38-63).[7] As representative of NIH's October 2000 changes, Mr. Brannon specifically addressed EWO 478 during his testimony. Bell prepared EWO 478 in response to 17 NIH sketches that required Bell to demolish the ceiling on the second floor, as well as the existing duct work and electrical items. (Brannon, Tr. 682-84; PX 94 at 46-51). In directing Bell to perform this additional work, NIH acknowledged that the demolition work was a change to the Contract that would result in increased cost and time impact. (PX 94 at 46-47).

In addition to the demolition changes, EWO 478 required Bell to install new variable air volume ("VAV") boxes and add ceiling reinforcements to install newly specified duct work. Due to the long lead time in procuring the new VAV boxes, Bell could not begin the VAV box installation until January 2001. (PX 94 at 46-51). The changes in EWO 478 affected the testing of the heating, ventilating, and air conditioning ("HVAC") systems on the second through sixth floors, because the VAV boxes had to be installed before the HVAC testing could begin. (Brannon, Tr. 682-87; PX 94 at 46-51; PX 94B at 121-24). The changes in EWO 478 alone impacted seven intermediate milestones and the Contract's substantial completion date by more than 140 days. (Brannon, Tr. 688-91; PX 94B at 124).

Mr. Brannon's summary chart for October 2000 shows that the six EWOs delayed each of the interim milestones from 148 to 197 days and delayed the Contract completion date by 172 days. (Brannon, Tr. 688-89; PX 94 at 63; PX 94B at 125).

3. November 1, 2000 Schedule Update

During November 2000, NIH issued changes that delayed nine intermediate schedule milestones, and the Contract's substantial completion milestone. (PX 94 at 63-76). Mr. Brannon analyzed EWO Nos. 497, 518, and 493, and determined the schedule impact by

[7] The exhibits relating to each of these EWOs are: EWO 461 – PX 352-56; EWO 511 – PX 359-61; EWO 478 – PX 363-65; EWO 639 – PX 368-69; EWO 483 – PX 372-73; and EWO 484 – PX 376-78.

inserting fragnets for each EWO into Schedule Update N129 for November 1, 2000.[8] As representative of NIH's November 2000 changes, Mr. Brannon specifically addressed EWO 518 during his testimony. Bell prepared EWO 518 in response to NIH's issuance of 27 sketches that required Bell to perform additional demolition work, reinforce ceilings, install approximately 80 new or modified VAV boxes and duct work, and revise the automatic temperature control system in the basement and on the first and second floors. (Brannon, Tr. 695-98; PX 94 at 68-73).

The changes in EWO 518 affected air balance and testing activities, the installation of ceiling tile, and the start-up and test of the automatic temperature control system. (Brannon, Tr. 695-97; PX 94 at 71). The November 2000 changes impacted work on all of the floors. (Brannon, Tr. 697-99). Mr. Brannon's summary chart for this period shows that three EWOs delayed nine interim milestones from 65 to 107 days, and delayed the Contract completion date by 107 days. (PX 94 at 76; PX 94B at 134).

4. December 1, 2000 Schedule Update

During December 2000, NIH issued changes that delayed seven intermediate schedule milestones, and the Contract's substantial completion milestone. (PX 94 at 76-82; PX 408-12). Mr. Brannon analyzed EWO 530, and determined the schedule impact by inserting a fragnet for this EWO into Schedule Update N130 for December 1, 2000. (PX 76-82). EWO 530 relates to air device designations for the autoclave/glass washroom A and B on the second and sixth floors. The change addresses sizing conflicts wherein the supply diffusers and exhaust grill dimensions did not match the supply and exhaust duct sizes. (PX 76-82; PX 408-12). This change affected the floors above the second floor since the work had to be performed in sequence. Bell had to complete testing on the second floor before moving to its work on the third floor. Bell followed the same process in moving from one floor to another up the building. (Brannon, Tr. 698).

Mr. Brannon prepared a fragnet of the work involved in EWO 530, and inserted it in Schedule Update N130. The fragnet showed an impact to activities affecting seven milestones, from 27 to 55 days, and a delay to the Contract completion date by 56 days. (PX 94 at 81-82).

[8] The exhibits relating to each of these EWOs are: EWO 497 – PX 386-87; EWO 518 – PX 390-93; and EWO 493 – PX 396-400.

5. January 1, 2001 Schedule Update

During January 2001, NIH issued changes that delayed eight intermediate schedule milestones, and the Contract's substantial completion milestone. (PX 94 at 82-125). Mr. Brannon analyzed EWO Nos. 475, 487, 488, 504, 523, 553, 554, 556, 560, 572, 573, and 574, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update N131 for January 1, 2001. (PX 94 at 82-125; Brannon, Tr. 699-700; PX 94B at 137).[9] As representative of NIH's January 2001 changes, Mr. Brannon specifically addressed EWO 487 during his testimony. Bell prepared EWO 487 in response to NIH's architectural, electrical and mechanical revisions to the administrative suites on the fifth floor. (Brannon, Tr. 699-700). The work activities in these revisions included: demolition of 400 square feet of walls and ceilings, re-framing and installation of drywall on 550 square feet of walls and ceilings, adding over 150 pounds of galvanized sheet metal duct work, relocating four sprinkler heads, revising wall cabinets, adding two doors, revising electrical wiring, and adding four light fixtures. (PX 94 at 121). The work required by EWO 487 delayed Bell's completion of the drywall, duct work, ceiling grid, electrical, and carpet installation on the fifth floor. (Brannon, Tr. 701-03; PX 94B at 139-42).

Mr. Brannon's summary chart shows that EWO 487 alone delayed four milestones, from 171 to 185 days, and delayed the Contract completion milestone by 183 days. (PX 94 at 124; PX 94B at 141-42). The 12 EWOs in total affected eight milestones, from 12 to 185 days, and delayed the Contract completion milestone by the same 183 days. (PX 94 at 124-25; PX 94B at 143).

6. February 1, 2001 Schedule Update

During February 2001, NIH issued changes that delayed nine intermediate milestones, and the Contract's substantial completion milestone. (PX 94 at 125-42). Mr. Brannon analyzed EWO Nos. 525, 570, 589, 593, 596 and 600, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update N132 for February 1, 2001. (Brannon, Tr. 704-05; PX 94 at 125-42).[10] As representative of NIH's February 2001

[9] The exhibits relating to each of these EWOs are: EWO 475 – PX 420-28; EWO 487 – PX 487-91; EWO 488 – PX 447-50; EWO 504 – PX 473-478A; EWO 523 – PX 452-57; EWO 553 – PX 431-34; EWO 554 – PX 437-40; EWO 556 – PX 443-44; EWO 560 – PX 459-60; EWO 572 – PX 463-65; EWO 573 – PX 468-70; and EWO 574 – PX 481-84.

[10] The exhibits relating to each of these EWOs are: EWO 525 – PX 506-12; EWO 570 – PX 499-503; EWO 589 – PX 528-29; EWO 593 – PX 515-17; EWO 596 – PX 532-33; and EWO 600 – PX 520-25.

changes, Mr. Brannon specifically addressed EWO 525 during his testimony. Bell prepared EWO 525 in response to NIH changes requiring Bell to add muntin bars to 33 type E doors, and requiring the substitution of decorative glass for tempered glass. NIH also changed these doors from wood to hollow metal. (Brannon, Tr. 705-06; PX 94B at 148). These doors affect the operation and balance of the air handling system. (Brannon, Tr. 706-07). EWO 525 thus affected the door installation, the test and balance of the HVAC system, and the final cleaning activities on the second floor, as well as all subsequent turnover dates. (PX 94 at 128-33).

Mr. Brannon's summary chart shows that EWO 525 alone delayed seven milestones, from 107 to 113 days, and delayed the Contract completion milestone by 99 days. (Brannon, Tr. 707-08; PX 94 at 133). The six EWOs in total affected nine milestones, from 92 to 113 days, and delayed the Contract completion milestone by the same 99 days. (PX 94 at 142; PX 94B at 153).

7. March 2001 Schedule Update

During March 2001, NIH issued changes that delayed seven intermediate milestones, and the Contract's substantial completion milestone. (PX 94 at 142-59). Mr. Brannon analyzed EWO Nos. 476, 515, 543, 557, and 620, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update N133 for March 1, 2001.[11] Id. As representative of NIH's March 2001 changes, Mr. Brannon specifically addressed EWO 543 during his testimony. Bell prepared EWO 543 in response to NIH changes to the third and fourth floor air balance systems. (Brannon, Tr. 708-09; PX 94 at 145-50). This EWO added or deleted 18 VAV boxes. On March 6, 2001, CRSS requested Bell to proceed with this work immediately, and to advise of the time impacts. (Brannon, Tr. 709; PX 94B at 158). To perform this change, Bell had to order the new VAV boxes, remove or modify previously completed work, and install the boxes along with other ongoing mechanical work. (Brannon, Tr. 710; PX 94B at 160).

Mr. Brannon's summary chart shows that EWO 543 alone delayed six milestones, from 99 to 112 days, and delayed the Contract completion milestone by 113 days. (Brannon, Tr. 710-11; PX 94 at 149-50). The five EWOs in total delayed seven milestones, from 18 to 112 days, and delayed the Contract completion milestone by the same 113 days. (PX 94 at 158-59; PX 94B at 162).

[11] The exhibits relating to each of these EWOs are: EWO 476 – PX 552-55; EWO 515 – PX 558-63; EWO 543 – PX 546-49; EWO 557 – PX 541–43; and EWO 620 – PX 566-67.

8. April 2001 Schedule Update

During April 2001, NIH issued changes that delayed five intermediate milestones, and the Contract's substantial completion milestone. (PX 94 at 159-71). Mr. Brannon analyzed EWO Nos. 473, 632, and 646, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update N134 for April 1, 2001.[12] Id. As representative of NIH's April 2001 changes, Mr. Brannon specifically addressed EWO 632 during his testimony. Bell prepared EWO 632 in response to NIH changes requiring Bell to reduce the pressure in the distribution pumps of the reverse osmosis system to 45 gallons per minute. Bell discovered that the distribution pumps discharged a pressure of 110 pounds per square inch ("psi"), which far exceeded the maximum working pressure of 50 psi for the faucets. (PX 94 at 163). To achieve a pressure reduction, Bell purchased a temporary pump, but later had to procure and install new pumps and a pressure relief valve. (Brannon, Tr. 711-12; PX 94 at 163-67).

Mr. Brannon's summary chart shows that EWO 632 delayed the Mechanical, Electrical and Plumbing ("MEP") milestone by 49 days, and the Contract completion milestone by 16 days. (Brannon, Tr. 713; PX 94 at 167). The three EWOs in total affected five milestones, from five to 49 days, and delayed the Contract completion milestone by 27 days. (PX 94 at 170-71; PX 94B at 171).

9. May 2001 Schedule Update

During May and June 2001, NIH issued changes that delayed three intermediate milestones, and the Contract's substantial completion milestone. (PX 94 at 171-83). Mr. Brannon analyzed EWO Nos. 509, 528, 653, and 655, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update N135 for May 1, 2001.[13] Id. As representative of NIH's May and June 2001 changes, Mr. Brannon specifically addressed EWO 655 during his testimony. Bell prepared EWO 655 in response to NIH changes requiring Bell to adjust the air flow of 117 exhaust terminal units throughout the project, and to modify the software for the exhaust terminal units. (Brannon, Tr. 713-14; PX 94 at 180-82; PX 94B at 176). This change affected the completion of functional performance testing for fans and fume exhaust ducts. Id.

---

[12] The exhibits relating to each of these EWOs are: EWO 473 – PX 575-77; EWO 632 – PX 580-83; and EWO 646 – PX 586-88.

[13] The exhibits relating to each of these EWOs are: EWO 509 – PX 596-601; EWO 528 – PX 604-08; EWO 653 – PX 610-11; and EWO 655 – PX 613-15.

Mr. Brannon's summary chart shows that EWO 655 delayed the MEP milestone by 37 days, and the Contract completion milestone by two days. (Brannon, Tr. 715-16; PX 94 at 182-83; PX 94B at 178). The four EWOs in total affected three milestones, from two to 37 days, and delayed the Contract completion milestone by 22 days. (PX 94 at 182-83; PX 94B at 179).

10. July 2001 Schedule Update

During July and August 2001, NIH issued changes that delayed three intermediate milestones, and the Contract's substantial completion milestone. (PX 94 at 183-203). Mr. Brannon analyzed EWO Nos. 678, 685, 686, 687, 688, and 689, and determined the schedule impact by inserting fragnets for each EWO into Schedule Update NA37 for July 2, 2001.[14] Id. As representative of NIH's July and August 2001 changes, Mr. Brannon specifically addressed EWO 678 during his testimony. Bell prepared EWO 678 in response to NIH changes requiring Bell to procure and install hand rails on the north side of the project, and to delete the hand rails previously installed on the south terrace. (Brannon, Tr. 716-17; PX 94 at 184-88; PX 94B at 184). The new handrails had to be fabricated, delivered and installed. Id. The handrails were not delivered to the site until November 28, 2001. (PX 94 at 187).

Mr. Brannon's summary chart shows that EWO 678 delayed the Contract completion milestone by 99 days. (Brannon, Tr. 721; PX 94 at 188; PX 94B at 187). The six EWOs in total affected three milestones, from 20 to 86 days, and delayed the Contract completion milestone by the same 99 days. (PX 94 at 188-203; PX 94B at 188).

11. September 2001 Schedule Update

During September 2001, NIH issued changes that delayed one intermediate milestone, and the Contract's substantial completion milestone. (PX 94 at 203-10). Mr. Brannon analyzed EWO 700 and determined its schedule impact by inserting a fragnet into Schedule Update NA39 for September 1, 2001. Id. Bell prepared EWO 700 in response to NIH changes requiring Bell to reinforce two sections of duct work in the penthouse by modifying the interior bracing and support, installing an analog differential pressure sensor in the duct to monitor high pressure readings, providing logic in the system, and ensuring that at least two exhaust air tunnels were open at all times on each side of the project. (Brannon, Tr. 721-22, 724; PX 94 at 204-09; PX 94B at 193-95; PX 656-64). The duct work had been damaged

[14] The exhibits relating to each of these EWOs are: EWO 678 – PX 622-26; EWO 685 – PX 628-30; EWO 686 – PX 632-36; EWO 687 – PX 638-40; EWO 688 – PX 643-45; and EWO 689 – PX 647-49.

by attempting to operate exhaust fans beyond their capacity, and the ducts could not withstand the airflow and pressure drops, causing the ducts to collapse. (Brannon, Tr. 724). Mr. Brannon's summary chart shows that EWO 700 delayed the MEP milestone by 25 days, and the Contract completion milestone by 11 days. (PX 94 at 209-10; PX 94B at 197).

12. December 2001 Schedule Update

During December 2001, NIH issued changes that delayed one intermediate milestone, and the Contract's substantial completion milestone. (PX 94 at 210-13). Mr. Brannon analyzed EWO 566 and determined its schedule impact by inserting a fragnet into Schedule Update N242 for December 1, 2001. Id. Bell prepared EWO 566 in response to an NIH change requiring Bell to install blank off panels. (Brannon, Tr. 728; PX 94 at 210-12; PX 94B at 203; PX 672-75). This change resulted from a conflict between the architectural and mechanical specifications. (Brannon, Tr. 728). Mr. Brannon's summary chart shows that EWO 566 delayed the MEP milestone by 23 days, and the Contract completion milestone by 11 days. (Brannon, Tr. 729; PX 94 at 213; PX 94B at 205).

13. Summary

In summarizing his analysis of the EWOs, Mr. Brannon concluded that: (a) Bell was entitled to time extensions of the individual milestone completion dates contained in Modification 093; (b) Bell was not liable to NIH for liquidated damages; and (c) Bell was entitled to an overall time extension of 284 days, extending the Contract completion milestone from April 30, 2001 to February 8, 2002. (Brannon, Tr. 729-30; PX 94 at 213-15).

Mr. Brannon also performed a windows analysis to reconcile his time impact analysis with the as-built data on the project. (Brannon, Tr. 641-43; 1265-66). Mr. Brannon reviewed the events that had actually occurred on the project, and compared them to the as-planned critical paths found in Bell's schedule updates prepared contemporaneously as work was performed. (Brannon, Tr. 641-42). He tracked by month the 14 milestone dates established in Modification 093, examining the individual critical paths, and identifying where delays were indicated. (Brannon, Tr. 643). He reviewed each of Bell's schedules that had been submitted to NIH, and compared the schedule to the actual events on the project as they were recorded in the following month. (Brannon, Tr. 643-44). Mr. Brannon's windows analysis confirmed that NIH's changes delayed activities in the schedule, and the causation was most visible through activities that remained incomplete month after month. (Brannon, Tr. 643-45). Mr. Brannon reached the same conclusions in the windows analysis that he had reached in the time impact analysis above. (Brannon, Tr. 656). Defendant did not effectively rebut any portion of Mr. Brannon's time impact analysis or his windows analysis.

F. Cumulative Impact and Labor Inefficiency

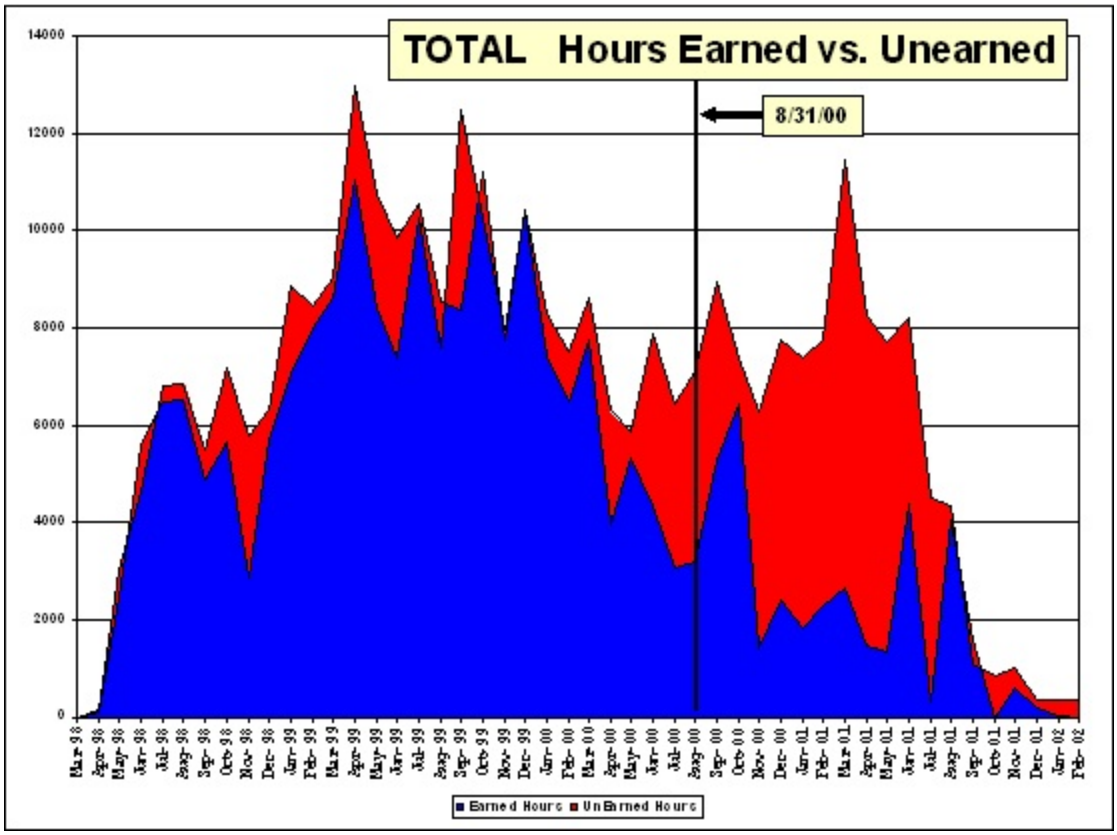
The Contract modifications on the project did not include the cumulative impact of the NIH changes. The modifications did not expressly release Bell's cumulative impact and labor productivity claims. (PX 708-913, Modifications 1-206; Brannon, Tr. 626-28). NIH did not provide any consideration to Bell in Modification 093 for cumulative impact or labor inefficiency. (PX 39; Brannon, Tr. 581-82). After notifying Bell that changes after Modification 093 would be kept to a minimum, NIH issued many changes that caused a cumulative impact to Bell's labor productivity. (Brannon, Tr. 730; PX 94 at 218-19). With 14 milestone dates in effect, any change had the potential of impacting more than one of these dates. (Brannon, Tr. 579-81). Bell experienced significantly higher labor costs than it had anticipated. (PX 94 at 218-19).

On this $63.6 million project, the $21.4 million in change orders increased the Contract price by 34 percent. Changes of this magnitude are unusual for building construction projects. (Brannon, Tr. 614-16; PX 94B at 32). The approximately 700 EWOs affected every floor of the project. (Brannon, Tr. 631-33; PX 94B at 51-59). Some changes, such as the duct work changes in EWO 478, changed the work on more than one floor. (Brannon, Tr. 631-32). NIH's internal project documents reflected serious concern regarding the extent of the changes after Modification 093. (Brannon, Tr. 636-40).

To determine the cumulative effect of NIH's changes, Mr. Brannon analyzed Bell's earned and unearned hours expended each week. (Brannon, Tr. 628-29; PX 94 at 227-29). Bell's practice for many years has been to track productivity rates by requiring the foremen to record each week the amount of units installed on a project, allowing Bell to compare the actual time to install units against its estimates for a given project. Where more time is spent installing units than estimated, Bell deems the additional time unproductive. (Brannon, Tr. 743-45).

On the NIH project, Mr. Brannon reviewed Bell's productivity level based on the weekly records of units installed for each cost code in Bell's system. (PX 94 at 227). Bell's productivity level could then be determined by comparing the actual labor expended to perform units of Contract work. (Brannon, Tr. 740-41; PX 94 at 227). Based upon this analysis, Mr. Brannon determined that the majority of unearned hours occurred after August 31, 2000, although some reduced productivity occurred prior to that date. (Brannon, Tr. 746-51; PX 94 at 227-29).

Mr. Brannon's chart of Bell's "Hours Earned vs. Unearned" before and after August 31, 2000 is instructive:



(PX 94 at 228). Among other things, the chart demonstrates that most of Bell's labor inefficiency occurred after Modification 093 had been negotiated and signed. The chart also shows that the period of greatest impact occurred from November 2000 through July 2001, when NIH lost control of the project.

Through 1999, Bell had completed a significant portion of the base Contract work, including the addition of the fourth floor, and incurred a non-productive work rate of eight percent on the project. (PX 94 at 229). Although Bell had been adversely affected by the fourth floor addition, Bell performed this extra work at or near the same productivity rates originally planned for the project. Id. Mr. Brannon attributed one-half of the non-productive hours to Bell for this period, and set Bell's reasonable productivity level at 104 percent of the originally planned productivity. Id. The Court accepts that Bell's original estimate for the project was reasonable, as Bell was not the low bidder for the project. (Stip. 8). Defendant has not shown that Bell's estimate was in any respect unreasonable.

Mr. Brannon compared actual hours incurred on the project against 104 percent of the originally planned hours to calculate unearned hours attributable to the NIH changes. (PX 94 at 229-30). Mr. Brannon found that approximately 25 percent of Bell's total hours

expended on the project were attributable to labor productivity loss caused by the NIH changes. Id. Using this method, Mr. Brannon determined that, of the 320,703 total hours, 80,317 hours were lost due to the impact of the NIH changes. (PX 94 at 230). At Bell's fully-burdened average hourly rate of $33.50 (rounded), the total labor productivity loss attributable to NIH is $2,690,649. Id. However, a portion of this labor loss is associated with hourly field supervision, which already is included in the calculations for the extended Contract period. Id. Mr. Brannon therefore deducted $632,193 for field supervision, reducing the labor productivity claim to $2,058,456. Id.

G. Other Damages

1. Unpaid Balance of Contract Price

The unpaid balance of the Contract price, $563,125, is the difference between the adjusted Contract amount, $85,048,515, and the amount paid to Bell, $84,485,390. This amount is not disputed by Defendant. Deft.'s Brief at 2.

2. Disputed EWOs

Bell seeks payment of $1,610,987 for 58 disputed EWOs. Bell asserts that NIH directed the performance of this work, that Bell performed the work as directed, but that NIH wrongfully has refused payment. (Bardin, Tr. 291, 1253-55; PX 100). The following are examples of how these disputes arose:

- EWO 151 involved a change to an oil/water separator to be installed below ground rather than above ground. The extra work called for additional excavation, and piping. The Contracting Officer approved of this extra work on March 29, 2001 for $8,839. (PX 137). On May 21, 2001, however, Mr. Temme recanted the Contracting Officer's approval, writing "no way" on a list of extra work items after the work had been performed. (PX 140, attach., at 3). Bell submitted revised pricing of $8,055 for EWO 151 on November 19, 2001 (PX 141), but NIH refused to honor the Contracting Officer's approval. The amount remained unpaid at Contract completion.

- EWO 305 involved a change to the elevator entryway lights. (PX 172-74). The change was necessitated by the NIH architect's design flaw. (PX 172). The Contracting Officer negotiated and settled this change on August 7, 2000. (PX 174). After Bell's subcontractor, Young Electrical, performed the work, NIH refused to make payment. On February 5, 2002, Bell requested a Contracting Officer's final decision, but none was issued. Id. At Contract completion, the disputed amount, $8,901, remained unpaid.

- EWO 474 involved a change to type 3 lights instead of type 58 lights in rooms 3241, 3340, and 3239 of the building. The Contracting Officer approved the change on March 1, 2001. (PX 187). Thereafter, on May 10, 2001, Bell submitted a proposed modification, but NIH rejected the proposal, after the work had been performed. (PX 189). Bell requested a Contracting Officer's final decision, but none was issued. At Contract completion, the disputed amount, $3,580, remained unpaid.

- EWO 507 involved elevator sump pump work not identified in NIH's drawings and specifications. (PX 195-201). Bell performed the required extra work, but NIH insisted that Bell had performed the work at no charge. Bell claimed that the details for the elevator sump pumps were eliminated during the planning phase by agreement of NIH and its architect. However, during construction, NIH directed Bell to perform sump pump work at no cost to NIH. (PX 201). Bell requested a Contracting Officer's final decision on April 25, 2001, but none was issued. Id. At Contract completion, the disputed amount, $28,081, remained unpaid.

- EWO 561 involved the addition of a bulkhead at the lockers in corridor 1500C of the building. (PX 218-19). Bell asserted that a bulkhead was not clearly indicated in the specifications, unlike all the other locker areas throughout the building. (PX 219). Bell's subcontractors proceeded with the work as directed, although NIH disputed that the bulkhead was not included in the specifications. A handwritten note initialed by Brian Temme on June 28, 2001 indicated that the Contracting Officer approved of this extra work on May 9, 2001 for $1,138, but the disputed amount remained unpaid at Contract completion. (PX 219).

- EWO 569 involved a change to the wire mold raceways necessary to accommodate the fifth floor bio-safety cabinets. The extra work required shortening and condensing of previously installed wire mold at two locations. (PX 222-23). NIH directed Bell to perform the rewiring at no cost to NIH, citing specification section 16010-2, para. 1.4.D. (PX 222). Section 16010-2, para. 1.4.D states, "[i]t shall be noted that a reasonable shifting in location of outlets (before installation) will be expected and this work shall be done at no increased cost to the owner." Id. Bell requested a Contracting Officer's final decision on May 15, 2001, asserting that section 16010-2, para. 1.4.D only required that "outlets" be shifted upon the owner's direction, not all "devices" and electrical raceways, and that this shifting must occur *before* installation. (PX 223). Since the electrical raceways already had been installed, any change to the location would be an added cost. The Contracting Officer did not issue a final decision, and at Contract completion, the disputed amount, $4,728, remained unpaid.

- EWO 698 involved the relocation of duct work on the second through the fifth floors. (PX 301-05). Eight different contractors performed this work at a cost of nearly $100,000. (PX 304). The disputed extra work covers only the removal and installation of previously installed wiring by Young Electrical. (PX 301). This work preceded the installation of the relocated duct work. NIH directed Bell to proceed with the relocation of the duct work prior to any negotiations. (PX 304). After the work had been completed, NIH rejected full compensation for the electrical work. In its February 18, 2002 request for a reconsideration, Bell noted NIH's delay in processing modifications and the consequent cash flow restrictions throughout the project. Id. The Contracting Officer rejected EWO 698, but offered Young Electrical $5,000 as a modification. At Contract completion, the disputed amount, $12,067, remained unpaid.

Also included among the disputed EWOs is $248,201 attributable to the interpretation of the Kit of Parts ("KOP") requirement. The KOP was a unit price mechanism for addressing laboratory items such as benches, culture rooms, isotope labs, lab alcoves, cold rooms, warm rooms, and darkrooms. The KOP items involved multiple subcontractors and suppliers. (Stip. 12). The KOP process allowed NIH to alter the quantities of items within 550 days after the start of Contract work. The Contract included a set of unit prices, including KOP prices, "for additional or reduced work directed and approved by the Contracting Officer." (PX 5 at B-1). The Contract further stated that "[u]nit prices quoted shall apply to additions or deletions within the quantity ranges listed in Specification Section 01026." Id. In Section 01026-2, the Contract provided that "[u]nit prices quoted shall be for additions or deletions of up to 5 units each." (PX 247 at 3). If NIH made more than five KOP changes, Section 01026 stated that "[u]nit prices for additional units beyond 5 units each shall be established by negotiation." Id.

NIH and Bell disagreed as to the proper interpretation of the KOP requirement. For example, NIH interpreted this requirement to mean that three additions and three deletions would be a net change of zero, while Bell interpreted three additions and three deletions as a total of six changes. (Bardin, Tr. 294-97, 450-51). Of the two interpretations, the Court finds Bell's interpretation more reasonable. The specification refers to "additions *or* deletions up to 5 units each," indicating that either an addition *or* a deletion could count toward the limit of five. (PX 247 at 3) (emphasis added). NIH failed to include any language in the Contract that would support its interpretation. Moreover, NIH made changes to walls and duct work as KOP changes, and refused to pay Bell if they totaled less than five changes. This broad application of the KOP requirement by NIH clearly was not warranted. Bell provided to NIH detailed cost support for its KOP claims. (PX 248-57). Defendant did not show that any of the KOP claims were unjustified or incorrect.

As to all of the disputed EWOs, Bell included them in its certified request for equitable adjustment, dated April 5, 2002. (PX 71) (damages analysis). The Contracting Officer did not grant relief for any of them in her July 1, 2002 final decision. (PX 73). Thus, even for EWOs where Bell asked for a final decision earlier, but did not receive one, the disputed EWOs are properly before the Court by virtue of Bell's April 5, 2002 request and the July 1, 2002 Contracting Officer's final decision.

3. Delay Damages

Bell claims $1,602,053 for having to remain on the project after April 30, 2001 until February 8, 2002. Mr. Brannon refers to this amount as "extended general condition costs." (Brannon, Tr. 737-40). These costs include among other things Bell's project management, field supervision staff, clerical support, field engineering, office trailers, equipment, supplies, storage facilities, trash dumpsters, pick-up trucks, fuel, temporary toilets, and utilities. (PX 94B at 210). Mr. Brannon relied upon Bell's job cost records to calculate delay damages, where he found that the general conditions costs for the project totaled $7,953,857. He divided this amount by 1,410 days, representing the total duration of the project from April 1, 1998 through February 8, 2002, to obtain a daily rate of $5,641 (rounded). (PX 94B at 211). He then multiplied the daily rate, $5,641, by 284 days of delay to arrive at a total of $1,602,053. Id. Other than asserting that the delays were not caused by NIH, which the Court rejects, Defendant did not rebut any element of this claim. Defendant's expert, Mr. Daigle, did not contest Mr. Brannon's calculation of the daily rate after understanding what costs were included in Bell's "general conditions costs." (Daigle, Tr. 1184-88; Brannon, Tr. 1257-58).

4. Profit

Bell has applied a 10 percent profit on the extended general conditions and labor inefficiency costs, which the Court finds fair and reasonable. (Brannon, Tr. 752). The claimed amount is $366,051.

H. Subcontractor Claims

On April 5, 2002, Bell "passed through" to the Contracting Officer the REA's of five subcontractors who worked on the project: Stromberg Metal Works, Inc., Young Electrical Contractors, Inc., Manganaro Corporation, NLP Enterprises, Inc., and ISEC, Inc. (Stip. 41). The Court admitted into evidence without objection the subcontractor claims and supporting data as follows: Stromberg – PX 67, 1075B; Young – PX 923-25; Manganaro – PX 70; NLP – PX 68, 914, 915, 915A-I; ISEC – PX 69. Only Stromberg, however, presented witnesses to testify under oath in support of its claim. The Stromberg witnesses had substantial

experience on laboratory construction projects, including other NIH projects. (Freeman, Tr. 896-97; Engle, Tr. 863-65; Bussey, Tr. 853-55).

Stromberg has fabricated and installed sheet metal duct work since 1940, and is the largest sheet metal contractor in the eastern United States. (Freeman, Tr. 895-96). On the NIH project, Stromberg was responsible for the installation of metal duct work in the interstitial spaces. (Bussey, Tr. 855; Freeman, Tr. 899). "Interstitial spaces" are the areas below floors where duct work is installed on a metal deck. The duct work is to be installed while the floors are open to allow the efficient assembly and hanging of ducts in large quantities. (Bussey, Tr. 856-57; PX 1498 at 1).

Due to the size and bulk of the duct work on the NIH project, the schedule called for Stromberg to install the ducts prior to the electrical and mechanical piping work, which also would be located in the interstitial spaces. (Bussey, Tr. 857-58). Stromberg began its installation work in February 1999. Initially, Stromberg worked in the basement and first levels of the project, and experienced little difficulty because the work areas were open and NIH had issued only a few changes. (Bussey, Tr. 855-57; Engle, Tr. 866-67). Thereafter, NIH made major revisions to each floor that caused Stromberg to work inefficiently. (Freeman, Tr. 906-07). The most significant revisions were documented in NIH Bulletins 31-34, which caused widespread changes to the second, third, fifth, and sixth floors. (Freeman, Tr. 903-04). NIH Bulletins 31-34 were incorporated into Modifications 55, 56, 58, 77, 80 and 84. (PX 762, 763, 765, 787, 791).

As the NIH changes mounted, Stromberg typically had to demolish duct work previously completed, and then reinstall new work to a different set of requirements. The NIH changes often came after other trades also had installed their work in the interstitial spaces. These complications occurred on every level and area of the project. (Engle, Tr. 865-66). As an example, in September 1999, when Stromberg had completed the rough-in of its Contract work on the third level, NIH issued Bulletin 32 requiring Stromberg to install 14,200 pounds of duct work in addition to the 40,921 pounds of duct work called for in the Contract. (Engle, Tr. 872-73; PX 1075B). Stromberg had to perform the extra work under poor conditions, and 20 percent involved demolition work. Bulletin 32 affected nearly all of the duct work on the third floor. (Engle, Tr. 872-74, 878).

Stromberg performed the changed work under tight working conditions. Its crews had to crawl over existing ducts and newly installed mechanical and sprinkler pipes to remove completed ducts. The changed duct work often had to be installed one piece at a time. The crews had to share the elevators with other trades. Stromberg installed the changed duct work on the third floor at a rate of 6.26 pounds per hour, compared to the 11.23 pounds per hour it experienced early in the project. (Freeman, Tr. 905, 910; PX 1075A, 1075B).

NIH's changes to the second, fifth, and sixth floors had a similar effect on Stromberg's productivity rate. In performing the changed work, Stromberg experienced an installation rate of 5.35, 6.68, and 5.57 pounds per hour, respectively, as opposed to the average unimpacted rate of 11.23 pounds per hour. (Engle, Tr. 867-72, 878-80; PX 1075A, 1075B). Some of the changes occurred late in the project, after the work areas had been closed in. The changed work proceeded very slowly due to the heat and the existence of other obstacles in the confined spaces. (Bussey, Tr. 858-60).

NIH's changes on the sixth floor involved the use of 3,000 pounds of welded stainless steel, which was more difficult to install than the galvanized duct originally required. (Engle, Tr. 879-81). Stromberg's witness described the changed welding work in the confined spaces as "horrible" and "very dangerous." (Engle, Tr. 880).

When NIH began making major changes to the duct work, Stromberg included labor inefficiency costs in its change order proposals. However, NIH would not consider the inclusion of inefficiency costs. (Freeman, Tr. 907-08). The Contracting Officer instructed Stromberg not to include labor inefficiency costs in its proposals, but to quantify any labor inefficiency at the end of the project for compensation. Stromberg complied with the Contracting Officer's direction. (Freeman, Tr. 908-10; PX 1241).

Stromberg tracks its production rate on the basis of pounds of material installed per hour. (Freeman, Tr. 901). Stromberg analyzed its labor inefficiency by using a "measured mile" approach, comparing its production rate from early in the project when there were few changes, with its production rate later in the project when NIH issued many changes. (Freeman, Tr. 903-05). For the period February through May 1999, Stromberg experienced a production rate of 11.23 pounds per hour. (Freeman, Tr. 899-905; PX 1075A). In contrast, when NIH began issuing major changes to the duct work, Stromberg's productivity rate was only 5.95 pounds of duct installed per hour. (Freeman, Tr. 911-12; PX 1075B).

Stromberg determined the amount of time it should have taken to perform the duct work under the NIH's changed requirements. Using the production rate of 11.23 pounds per hour, Stromberg calculated that 20,694 hours would have been required to perform the changed work. (Freeman, Tr. 911-12, PX 1075B). At the production rate actually experienced, 5.95 pounds per hour, Stromberg expended 39,072 hours to complete the installation on the second, third, fifth, and sixth floors. (Freeman, Tr. 911-12; PX 1075B). The difference between 39,072 hours and 20,694 hours represents the 18,377 inefficient hours (rounded) that Stromberg is claiming. Id. Applying its average hourly rate of $44.19, including burden and profit, Stromberg's claim for inefficiency costs is $812,092. (Freeman, Tr. 913).

I. Liquidated Damages

Defendant presented the testimony of an expert witness, Ted Scott, to show that Bell was not entitled to time extensions on the project, and that NIH should receive $447,678 in liquidated damages. (Scott, Tr. 1098; DX 151 at 65, 76-77). Mr. Scott performed a windows analysis of the schedule, which he states is similar to a retrospective time impact methodology that Mr. Brannon employed. (Scott, Tr. 1070, 1073, 1076). Mr. Scott determined that only one EWO, the mechanical revisions in EWO 518, caused any excusable delay to Bell. (Scott, Tr. 1094-95). Of the total delay that Mr. Scott identified on the project, he attributed only 32 days to NIH, based upon EWO 518, and 218 days to Bell. (Scott, Tr. 1095, 1098; DX 151 at 65). With approximately 730 EWOs on the project, it is not credible to conclude that just one of 730 caused excusable delay to the prime contractor. Mr. Scott asserted general allegations of "problems with the subcontractors" and "lack of manpower" to explain Bell's delays (Scott, Tr. 1106), but without more, the Court does not give any weight to these contentions.

The record further indicates that NIH was not planning to assess any liquidated damages against Bell unless Bell submitted a claim. (Temme, Tr. 1017-18; PX 61). Apparently upon the advice of NIH counsel, the agency asserted claims for liquidated damages and backcharges against Bell as a means of gaining leverage in settlement negotiations. (Temme, Tr. 1018-27; PX 80A). On this basis, NIH withheld a Contract balance of $563,125 from Bell. (PX 73 at 7). NIH has known as recently as April 2004 that it has no legitimate backcharges against Bell. (PX 80A). Mr. Temme stated in a 2004 e-mail to the Contracting Officer that "[i]n summary, we have nothing to backcharge at this point in time, but several potentials," and that "[i]f we are going to negotiate with them on the delay claim, I would throw this stuff into the mix." Id. Mr. Temme further stated in another 2004 e-mail to the Contracting Officer that "I'm not aware of any costs incurred by NIH to date that we would charge to Bell – I think they addressed everything they were assigned, except the few things they disputed and we decided we didn't have a strong enough case to fight them . . . ." Id.

Discussion

A. Standard for Decision

Bell's claim for damages from delay and cumulative impact on the NIH project sometimes is called a "delay and disruption" claim. As the Court noted in its earlier opinion in this case, there is a distinction in the law between: (1) a "delay" claim; and (2) a "disruption" or "cumulative impact" claim. The Court described the difference as follows:

> Although the two claim types often arise together in the same project, a "delay" claim captures the time and cost of *not* being able to work, while a "disruption" claim captures the cost of working less efficiently than planned.

Bell BCI Co. v. United States, 72 Fed. Cl. 164, 168 (2006); see also U.S. Indus., Inc. v. Blake Constr. Co., Inc., 671 F.2d 539, 546 (D.C. Cir. 1982) (holding that, unlike a delay claim that provides redress from not being able to work, a disruption claim compensates for damages when the work is more difficult and expensive than anticipated).

The contractor must prove for either claim the elements of liability, causation, and resultant injury. Servidone Constr. Corp. v. United States, 931 F.2d 860, 861 (Fed. Cir. 1991) (citing Wunderlich Contracting Co. v. United States, 173 Ct. Cl. 180, 351 F.2d 956, 968 (1965)). When the contractor is asserting a delay claim, the contractor has the burden of showing the extent of the delay, that the delay was proximately caused by government action, and that the delay caused damage to the contractor. Wilner v. United States, 24 F.3d 1397, 1401 (Fed. Cir. 1994) (en banc).

A contractor may recover breach of contract damages from the Government by showing that: (1) the damages were reasonably foreseeable by the breaching party at the time of contracting; (2) the breach is a substantial causal factor for the damages; and (3) the damages are proven with reasonable certainty. See, e.g., Citizens Fed. Bank v. United States, 474 F.3d 1314, 1318 (Fed. Cir. 2007) (holding that trial court did not abuse discretion in applying substantial factor rather than but-for theory of causation); see also Delco Elecs. Corp. v. United States, 17 Cl. Ct. 302, 320 (1989) (holding contractor entitled to equitable adjustment upon showing a causal connection between reasonable costs claimed and the event giving rise to the claim).

While the law requires "reasonable certainty" to support a damages award, damages do not need to proven with mathematical exactness. Rather, "[i]t is sufficient if [a claimant] furnishes the court with a reasonable basis for computation, even though the result is only approximate." Ace Constructors, Inc. v. United States, 70 Fed. Cl. 253, 274 (2006) (citing Wunderlich Contracting, 351 F.2d at 968; Locke v. United States, 151 Ct. Cl. 262, 283 F.2d 521, 524 (1960); F.H. McGraw & Co. v. United States, 131 Ct. Cl. 501, 130 F. Supp. 394, 399 (1955)); see also Daly Constr., Inc. v. Garrett, 5 F.3d 520, 522 (Fed. Cir. 1993) (holding that "it was incumbent upon [the contractor] to establish a reasonable method for computing the requested compensation.").

The preferred method for proving costs is through the submission of actual cost data. Delco, 17 Cl. Ct. at 321 (citing Cen-Vi-Ro of Texas, Inc. v. United States, 210 Ct. Cl. 684,

538 F.2d 348 (1976)). However, where actual cost data is not available, estimates of the costs may be used. Estimates of costs "should be prepared by competent individuals with adequate knowledge of the facts and circumstances," and should be "supported with detailed substantiating data." Delco, 17 Cl. Ct. at 321 (citations omitted). The Court also must be alert to cases where the Government has caused the circumstances making the ascertainment of damages difficult. As the Court of Claims noted in Locke:

> . . . [T]he constant tendency of the courts is to find some way in which damages can be awarded where a wrong has been done. Bigelow et al. v. RKO Radio Pictures, 327 U.S. 251, 265, 66 S.Ct. 574, 90 L.Ed. 652. Difficulty of ascertainment is not to be confused with right or recovery. Nor does it exonerate the defendant that his misconduct, which has made necessary the inquiry into the question of harm, renders that inquiry difficult. Eastman Kodak Co. v. Southern Photo Materials Co., 273 U.S. 359, 379, 47 S.Ct. 400, 71 L.Ed. 684. The defendant who has wrongfully broken a contract should not be permitted to reap advantage from his own wrong by insisting on proof which by reason of his breach is unobtainable. Crichfield v. Julia, 2 Cir., 147 F. 65.

Locke, 283 F.2d at 524. The Court thus should consider the Government's actions on the project that caused damage to the contractor, the quality of the data that the contractor has presented to the Court, and the reasonableness of the damages asserted, considering all of the relevant evidence.

B. Bell's Cumulative Impact Claim

Government change orders on building projects such as NIH Building 50 may add or subtract to the contractor's cost of performance, and may affect the time required to complete the work. Bilateral modifications agreed to by the parties generally cover the costs and time of performing the changed work. On a project where the Government issues many change orders, bilateral modifications will compensate the contractor for the cost of performing the changed work, but the cumulative effect of the changes may add to the contractor's time and effort in performing the unchanged work as well. Unless provided otherwise, the bilateral modifications will compensate the contractor for performing the changed work, but not for the impact of multiple change orders on the unchanged work.

Until 1967, the Rice doctrine precluded courts from considering the effect of change orders on portions of the work not directly covered by the change. See Rice v. United States, 317 U.S. 61, 64-65 (1942). To avoid inequitable results, the Government changed the

standard Changes clause in late 1967 to add language that covers the effect of changes on unchanged work. The Changes clause in the Bell/NIH contract includes this language:

> (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, *whether or not changed by any such order*, the Contracting Officer shall make an equitable adjustment and modify the contract in writing.

FAR ¶ 52.243-4, "Changes (AUG 1987)"; see PX 5 at I-20 (emphasis added). The Contract thus expressly contemplated the need for an equitable adjustment when the cumulative impact of many change orders affected the contractor's performance of unchanged work.

Based upon the evidence presented, the Court is satisfied that Bell has established a reasonable basis for its cumulative impact claim, and Defendant has failed to show that the claim should be denied or reduced in any respect. Bell's expert, Mr. Brannon, quantified the cumulative impact of NIH's changes by using Bell's historical productivity data and project records for measuring earned and unearned hours. Mr. Brannon's estimate of what the project should have cost is based upon Bell's bid price, which the Court finds reasonable. As an experienced contractor familiar with NIH laboratory construction (Bell, Tr. 212-14), Bell knew what the project would cost, and it knew how to track earned and unearned hours with reasonable precision. The fact that Bell was not the low bidder for the NIH project adds further credence to the reasonableness of its bid price. (Stip. 8). As a conservative measure, Mr. Brannon added four percent to Bell's baseline hours upon examining Bell's performance through the end of 1999. Mr. Brannon's baseline thus is 104 percent of the hours included in Bell's bid price. (PX 94 at 230).

Mr. Brannon determined that approximately 25 percent of Bell's labor hours were due to lost productivity caused by NIH's changes. Mr. Brannon calculated that, of the 320,703 total hours that Bell expended, 80,317 hours were chargeable to the Government. (PX 94 at 230). Bell incurred most of these hours after August 30, 2000, about the time that NIH began to lose control of the project.

In a July 2004 "Lessons Learned" report, NIH explained that it adopted the phased occupancy schedule in Modification 093 for several reasons:

> The project schedule was behind, yet campus pressures required that people move into the building as soon as possible. At the time, there was a domino effect of renovations and construction occurring throughout the campus. Further delay of the completion of Building

> 50 would have potentially delayed the renovations of Buildings 3 and 6 and, ultimately, the Building 10 Revitalization Program. Included in this plan, the Building 50 CQM offices were to move out of Building 50 and into Building 3, when vacated, so that the space in 50 could be finished. This strategy, while approved through the highest levels of DES and ORS, seems to be responsible for many of the problems and ill-will that followed.

(PX 83 at 15) (emphasis in original). In the same document, NIH explained that the scientists who would occupy Building 50 "were asking for major, wholesale changes" resulting in "many 'renovations' prior to move-in." Id. at 13-14. Thus, at a time when NIH no longer had any room in its campus relocation schedule for time extensions, changes from scientists continued to occur. The floor addition contributed to multiple exhaust system deficiencies, and more changes, throughout the building. Id. at 4.

The combination of these conflicting factors created a classic environment for cumulative impact and labor inefficiency. Multiple change orders on a construction project potentially can be accommodated if the owner acknowledges that additional time and money will be required, and if the parties carefully plan the sequencing of the changed work. However, if the owner as here denies the additional time or money to perform changed work, but nevertheless continues the flow of change orders to the contractor, a chaotic project inevitably will result. In this case, there were 279 EWOs and 113 contract modifications issued after August 30, 2000, while NIH project personnel were maintaining that no further changes would be issued. The project environment was contentious, as NIH representatives bordered on bad faith in denying payment to Bell for extra work performed.

The factual evidence thus supports Mr. Brannon's conclusion that 25 percent of Bell's labor hours were attributable to NIH changes, and that most of those hours were expended after August 31, 2000. The Court finds Mr. Brannon's estimate to be reasonable when considering the number of changes, the amount of replacement of previously completed work, and the overall deteriorated project environment. The Court sustains Bell's cumulative impact claim for $2,058,456.

C. Defendant's Accord and Satisfaction Defense

The Court discussed in its earlier decision in this case the requirements for an accord and satisfaction defense, and identified the four elements that a party asserting such a defense must establish: (1) proper subject matter; (2) competent parties; (3) a meeting of the minds; and (4) consideration. Bell BCI Co. v. United States, 72 Fed. Cl. 164, 168-69 (2006) (citing Jackson Constr. Co. v. United States, 62 Fed. Cl. 84, 92 (2004)). The Court analyzed the

language in Modification 093, and determined that a trial would be necessary to decide whether any of the provisions could be regarded as a "meeting of the minds" on Bell's cumulative impact claim, or whether any consideration could be identified in settlement of the claim. Id. After hearing the evidence, the Court finds that Defendant's defense is no better off now than it was at the time of the earlier decision. Defendant presented no evidence at trial to augment its previous motion for summary judgment.

None of the 206 contract modifications issued on the project includes any NIH payment or other consideration to Bell for a disruption, cumulative impact, or labor inefficiency claim. Similarly, none of the modifications contain any language explicitly waiving or releasing such a claim. While language sporadically appears in some modifications purporting to reserve rights, the Court cannot say that any meeting of the minds between the parties ever occurred. There is no evidence that NIH ever provided any consideration to Bell to settle a cumulative impact claim. Many of the events relevant to the cumulative impact claim did not even arise until after the parties signed Modification 093.

Given the clear distinction in the law between (1) the cost of performing changed work, and (2) the effect of multiple changes on unchanged work, prudent contracting parties surely would be specific in describing the exact scope of any release or reservation of rights. The fact that Modification 093, or any other modification on this project, did not expressly address Bell's cumulative impact claim explains why the Court previously denied cross-motions for summary judgment, and invited testimony at trial.

Defendant, however, did not offer any testimony at trial in support of its accord and satisfaction defense. The Court is left with no more information from Defendant after trial than it had before trial. Defendant included the NIH Contracting Officer, Barbara Taylor, on its witness list, but did not call her to testify. Ms. Taylor is the person who signed Modification 093 binding NIH to its terms, and who presumably would be in a position to know whether Defendant's accord and satisfaction defense has any factual basis. By her failure to testify, the Court may infer that her testimony would not have supported Defendant's position. See Day & Zimmermann Servs., Inc. v. United States, 38 Fed. Cl. 591, 603-04 (1997) (drawing inference that testimony would have been unfavorable where defendant failed to call source selection officials as witnesses even where plaintiff brought their absence to the court's attention during hearing); Hageny v. United States, 215 Ct. Cl. 412, 570 F.2d 924, 935-36 (1978) (holding that persons listed as witnesses by defendant but not called to testify supports an inference that the testimony would have been unfavorable to defendant); see also Borror v. Herz, 666 F.2d 569, 573-74 (C.C.P.A. 1981) (holding that "the unexplained failure to call any known non-hostile person who has direct knowledge of facts being developed by the party raises the inference that the testimony would be unfavorable or at least would not support the case.").

Based upon a careful review of the 206 Contract modifications, the Court concludes that Defendant's accord and satisfaction defense is without merit. The Court bases this conclusion upon the absence of any explicit language releasing the cumulative impact claim, the absence of any consideration provided to Bell to settle the cumulative impact claim, and the fact that many of the events supporting the claim occurred after Modification 093, the document upon which Defendant chiefly relies. To the extent ambiguity exists in Modification 093 or in the modifications collectively, NIH as the drafter of these documents "must bear the risk of any contractual uncertainty, ambiguity or inequitable consequence." Firestone Tire & Rubber Co. v. United States, 195 Ct. Cl. 21, 444 F.2d 547, 551 (1971) (citing Sturm v, United States, 190 Ct. Cl. 691, 421 F.2d 723, 727 (1970); Peter Kiewit Sons' Co. v. United States, 109 Ct. Cl. 390, 418 (1947).

D. Schedule Issues – Bell's Delay Claim and NIH's Liquidated Damages Claim

Each party presented expert testimony at trial to explain the causes of the significant schedule delays encountered on the project. The original Contract completion date was June 29, 2000, but Bell did not actually complete the project until February 8, 2002, a delay of 19-1/2 months. NIH granted time extensions of 304 calendar days in Modifications 005, 024, 078, and 093, through April 30, 2001. (PX 94B at 2). The amount of time in dispute thus is the 284-day period from April 30, 2001 until February 8, 2002.

Bell's expert, Mr. Brannon, employed a time impact analysis as the method for measuring delays to the CPM schedule. He looked at selected EWOs each month from September 2000 through December 2001, and inserted fragnets into the CPM update for the applicable month to determine the effect of the extra work. In selecting EWOs for his review, Mr. Brannon eliminated EWOs that were in dispute between the parties, and EWOs transmitted to Bell prior to August 31, 2000. (Brannon, Tr. 669-71). After making these cuts, there were 184 EWOs remaining for his analysis, of which he reviewed 49 initially. (Brannon, Tr. 671-72). Mr. Brannon found that these 49 EWOs alone showed that the entire delay from April 30, 2001 to February 8, 2002 was excusable. He concluded that the review of the other 135 EWOs would have been redundant. Id. Mr. Brannon employed a time impact analysis in part because the Contract required Bell to use this method when requesting a time extension. (Contract Specifications, Section 1310 at ¶ 7.01C). The parties waived the seven-day requirement for submitting a time impact analysis through their course of dealing. See Miller Elevator Co., Inc. v. United States, 30 Fed. Cl. 662, 687-90 (1994) (holding that Government waived specification and was estopped). Mr. Brannon confirmed the results of his time impact analysis by performing a windows analysis as well.

Defendant has criticized Mr. Brannon's analysis as constituting a "theoretical approach," but Defendant did not show any material inaccuracies in Mr. Brannon's study.

To the extent Defendant did not accept the schedule fragnets that Mr. Brannon inserted into the CPM monthly updates, it is only necessary to consider any of the other 135 EWOs found to be "redundant." (Brannon, Tr. 672). The Court finds the evidence of excusable delay from changed work to be so overwhelming that a reasonable person could not reach a contrary result.

In contrast, Defendant's expert, Mr. Scott, while purporting to conduct a windows analysis similar to Mr. Brannon's, concluded that only one EWO caused any delay to Bell on the entire project. (Scott, Tr. 1094-95). Of the total delay that Mr. Scott identified on the project, he attributed only 32 days to NIH, based upon EWO 518, and 218 days to Bell. (Scott, Tr. 1095, 1098; DX 151 at 65). Mr. Scott asserted general allegations of "problems with the subcontractors" and "lack of manpower" to explain Bell's delays, (Scott, Tr. 1106), but without more, the Court does not give any weight to these contentions. Mr. Scott's conclusions simply are not credible in light of the mountainous evidence of changed work on the project.

Moreover, NIH did not believe that it had a factual basis to assert a liquidated damages claim against Bell. NIH asserted this claim only upon the advice of counsel to create negotiating leverage in the event Bell filed a claim against NIH. (Temme, Tr. 1018-27; PX 80A). On this basis, NIH withheld a Contract balance of $563,125 from Bell. (PX 73 at 7). The admissions of Mr. Temme at trial and in contemporaneous project documents that "we have nothing to backcharge against [Bell]," are dispositive of NIH's liquidated damages claim. See PX 80A.

Mr. Brannon presented a reasonable and accepted computation of Bell's delay damages, totaling $1,602,053. (PX 94B at 210-211). He reached this amount by determining a "general conditions" cost per day of $5,641, and multiplying the daily charge by the 284 days of delay. Id. Defendant's expert, Mr. Daigle, did not materially disagree with Mr. Brannon's calculation. (Daigle, Tr. 1184-91). Mr. Daigle acknowledged that NIH estimated Bell's daily rate at $7,000 during construction, a higher amount than used in Bell's damages calculation. (Daigle, Tr. 1186). Accordingly, the Court accepts Bell's delay damages calculation of $1,602,053.

E. Bell's Other Damages

1. Unpaid Balance of Contract Price

As noted, the parties agree that the balance of the Contract price to be credited to Bell is $563,125. NIH apparently withheld this amount because of its liquidated damages claim. (PX 73). Since the Court has denied NIH's liquidated damages claim, and with no other

credits due NIH, the unpaid balance of the Contract price will be included in Bell's damages award.

2. Disputed Extra Work Orders

Bell's claim for 58 disputed EWOs is $1,610,987. Bell met its burden of establishing that it performed the extra work directed by NIH on the project, that its costs were reasonable (and in some cases, approved by the Contracting Officer), and that it has not been paid for the work performed. Defendant did not rebut any portion of this claim. Accordingly, the Court will award the claimed amount of $1,610,987 to Bell as part of the damages award.

3. Profit

Bell claims a 10 percent profit on the extended general conditions and labor inefficiency costs, which the Court finds fair and reasonable. (Brannon, Tr. 752). The claimed amount is $366,051. A 10 percent profit is reasonable in light of the increased contractor management and risk associated with running a project beset with changes and delays. See Delco Elecs. Corp. v. United States, 17 Cl. Ct. 302, 320 (1989) (holding that contractor efforts and risks justified 10 percent profit); see also J. Cibinic, R. Nash & J. Nagle, Administration of Government Contracts 739 (4th ed. 2006) (explaining that 10 percent profit in the pricing of equitable adjustments is "more or less standard.").

F. Subcontractor Claims

The Court sustains the claim of Stromberg Metal Works, Inc., but denies the claims of the four other subcontractors, Young Electrical Contractors, Inc., Manganaro Corporation, NLP Enterprises, Inc., and ISEC, Inc. Stromberg was the only subcontractor to have witnesses appear at trial to support its claim. Stromberg's "measured mile" approach for measuring productivity is an accepted method to prove a cumulative impact claim. See U.S. Indus., Inc. v. Blake Constr. Co., Inc., 671 F.2d 539, 547 (D.C. Cir. 1982) (noting that the "comparison of the cost of performing work in different periods is a well-established method of proving damages.").

Although the other subcontractors may have had viable claims, Bell did not submit any specific evidence in their behalf, and they did not present any witnesses at trial. On an action filed in this Court from a Contracting Officer's final decision, the Court conducts its review on a de novo basis. 41 U.S.C. § 609(a)(3). The Court affords no weight or deference to the Contracting Officer's final decision, or to the underlying claims. England v. Sherman R. Smoot Corp., 388 F.3d 844, 853-57 (Fed. Cir. 2004); Wilner v. United States, 24 F.3d 1397, 1401-02 (Fed. Cir. 1994); Assurance Co. v. United States, 813 F.2d 1202, 1206 (Fed.

Cir. 1987); Renda Marine, Inc. v. United States, 66 Fed. Cl. 639, 647 (2005). The Court cannot grant any award to a subcontractor simply because the underlying claim to the Contracting Officer is part of the record. Where, as here, material facts are disputed, Bell or the subcontractor must present evidence to satisfy plaintiff's burden of proof requirements. See Blinderman Constr. Co., Inc. v. United States, 39 Fed. Cl. 529, 537 (1997) (holding that for a contractor to receive an equitable adjustment, it must prove liability, causation and resultant injury by a preponderance of the evidence) (citing Wilner, 24 F.3d at 1401). Accordingly, the claims of the four other subcontractors are denied.

Conclusion

Based upon the foregoing, the Court awards damages to Plaintiff Bell BCI Company of $6,200,672, and to Stromberg Metal Works, Inc. of $812,092. Each damages award shall have CDA interest applied pursuant to 41 U.S.C. § 611, from April 5, 2002 until the date of payment. The Clerk of Court is directed to enter judgment for Plaintiff in the stated amounts. Costs are awarded to Plaintiff.

IT IS SO ORDERED.

s/Thomas C. Wheeler
THOMAS C. WHEELER
Judge