ARMED SERVICES BOARD OF CONTRACT APPEALS

Appeal of --	)	
	)	
Bay West, Inc.	)	ASBCA No. 54166
	)	
Under Contract No. DACW37-02-C-0001	)	

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OPINION BY ADMINISTRATIVE JUDGE PARK-CONROY

This is an appeal from a deemed denial of appellant's claims arising out of two differing site conditions, debris and stiff clay, it alleged it encountered during dredging operations at McMillan Island on the Mississippi River. Extensive briefs were submitted following a five-day hearing on entitlement in St. Paul, MN. We decide entitlement only and sustain the appeal to the extent indicated.

FINDINGS OF FACT

Fixed-price Contract No. DACW37-02-C-0001 in the amount of $1,463,504.00 was awarded to appellant Bay West, Inc. on 19 December 2001. The contract required the removal (excavate/dredge) and transport, ultimately to the Buck Creek placement site, of approximately 170,000 cubic yards of previously dredged material from its temporary placement site on McMillan Island, near Guttenberg, Iowa. (R4, tab 2)

The contract contained the following standard FAR clauses of relevance to the issues in this appeal: 52.233-1, DISPUTES (DEC 1998); 52.236-2, DIFFERING SITE CONDITIONS (APR 1984); 52.236-3, SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984); 52.236-4, PHYSICAL DATA (APR 1984); and 52.236-27, SITE VISIT (CONSTRUCTION) (FEB 1995) (R4, tab 2 at 24, 96, 98, 99, 142 of 145). The Physical Data clause provided in relevant part:

> (a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and subsurface exploration. The subsurface exploration included soil borings and soils testing noted on the boring logs. Graphic logs of borings located within the area of work under this contract are shown on the drawings. The borings are representative of subsurface conditions at their respective locations and for their respective vertical reaches. Variations in stratigraphy and characteristics of the soil and rock are known to occur between borings. Normal variations in site geology will not be considered as differing materially within the purview of Contract Clause, FAR 52.236-2 Differing Site Conditions.

(R4, tab 2 at 143 of 145)

Pursuant to FAR 52.211-10, COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984) – ALTERNATE I (APR 1984), an interim completion date was set for 30 October 2002, with a final completion date of 30 June 2003 (R4, tab 2 at 137 of 145). Modification No. P00003, dated 22 March 2002, extended the contract time by 34 days, setting 3 December 2002 and 3 August 2003 as the interim and final completion dates (R4, tab 2).

At issue in this appeal is the "Excavation and Relocation of Existing Dredge Material from McMillan Island" work specified for Contract Line Item (CLIN) 5. Bay West bid $546,000.00 for CLIN 5AA "First 140,000 Cubic Yards" and $97,500 for an estimated quantity of 30,000 cubic yards for CLIN 5AB "Over 140,000 Cubic Yards." The bid abstract established that the only other bidder, L.W. Matteson, Inc. (Matteson), bid $557,200.00 and $57,300.00 for CLINs 5AA and 5AB and that the government's estimates for these items were $350,000.00 and $75,000.00, respectively. (R4, tab 2 at 3 of 145, tab 16, ex. 57)

Paragraph 3.4, "McMILLAN ISLAND DREDGED MATERIAL CHARACTERISTICS" of the "EXCAVATION OF DREDGE MATERIAL" specifications contained in section 02323 provided:

> The Contractor is responsible for determining the character of the existing material to the extent necessary for it's [sic] own purposes before commencing excavation work. McMillan Island is composed primarily of dredged material piles placed through previous dredging operations. Past projects for excavation of temporary dredge piles have encountered trees

> and some other minor amounts of debris as described herein. The Contractor shall implement a method for removing and disposing of the trees and debris. All material that can not [sic] be transported hydraulically shall be disposed of as debris and waste in accordance with SECTION: GENERAL.
>
> The material to be relocated above elevation 612 can be assumed to consist of predominantly previously dredged sand from the river channel. The dredged material may contain obstructions including but not limited to stones, rubble, wire rope, stumps & trees from snagging operations, and other debris. Predominantly native soils exist below elevation 612. The borings taken around the perimeter of the island indicate approximately six feet of organic silty clay underlain by sands. It shall be the responsibility of the Contractor to make a determination of the characteristics of the native soils at McMillan Island.

(R4, tab 2, § 02323-2)

A plan and section view drawing showing the topography of McMillan Island and the sand pile as surveyed in February 1997 is depicted on Contract Drawing No. M-P10-60/003. The plan view was entitled: "MCMILLAN ISLAND DREDGED MATERIAL PILE." The section view was entitled: "DREDGED MATERIAL PILE" and indicated that material was to be excavated to a bottom elevation of 606 feet. Note 3 of the drawing stated: "EXISTING TOPOGRAPHY VARIES FROM TOPOGRAPHY SHOWN. 33,000 CY ADDITIONAL DREDGE SAND PLACED IN SEPTEMBER 1997, 6,400 CY ADDITIONAL SAND PLACED IN SEPTEMBER 1998. 29,000 CY ADDITIONAL DREDGE SAND PLACED IN 1999." (R4, tab 3 at sheet 4 of 18) The topographical information was not sufficient to permit bidders to determine the actual height of the sand pile at any given point (tr. 3/98).

Drawing No. M-P10-60/003 also indicated that three soil borings, 01-7M, 01-8M and 01-9M, had been taken at locations on the perimeter of the island, adjacent to the dredge sand pile (R4, tab 3 at sheet 4 of 18). The logs for these three borings are found on Contract Drawing No. M-P10-10/026 (R4, tab 5 at sheet 2 of 3). The material between elevations 612 and 600 was described as follows on the right side of the boring log staffs:

Log 01-7M

"CLAY, ORGANIC, SILTY, V. SOFT, SATURATED, PLANT FRAGMENT, BLK.
CLAY, ORGANIC, SILTY, SOFT, PLANT FRAGMENT, BLK."

Log 01-8M

"SAND F., DREDGE
CLAY, ORGANIC, SILTY, V. SOFT, SAT., STICKY, PLANT FRAGMENT."

Log 01-9M

"CLAY, ORGANIC, SILTY, V. SOFT, SATURATED, ROOTS & WOODY PLANT FRAGMENT, MEALY-WAVY TEXTURE, BLK. – DK. GR.
SAND F.-M., LOOSE, BRN."

(R4, tab 5 at sheet 2 of 3)

The borings were taken and the logs prepared in June 2001 by Mr. Terry Jorgenson, a Corps geologist, who explained that the information on the contract boring logs is a summary of his field observations and logs. Mr. Jorgenson confirmed that the field logs and the classifications to the right of the staff on the contract boring logs above elevation 600 describe silty organic clay, very soft and soft. (R4, tabs 3,16, exs. 43, 44, 45; tr. 4/121-34) He did not perform any further laboratory or other analysis of these soils (tr. 4/131, 143, 150). The McMillan Island work site was within the reasonable bounds at which the borings had been taken (R4, tab 3).

There were four identical notes beneath each of the boring logs. Of relevance is Note 2 which stated: "STANDARD PENETRATION TESTS NOT TAKEN, ALL CLAYS WERE SOFT OR MED. STIFF, ALL SANDS ENCOUNTERED WERE LOOSE OR MED. DENSE." (R4, tab 5) Mr. Jorgenson could not explain why Note 2 was added to the drawing, or why the note included "med. stiff," but not "very soft," in the description of the clay (tr. 4/131-36). The field boring logs do not reflect any medium stiff clay at the elevations at issue (R4, tab 16, exs. 43-45).

The Corps took more borings at the Buck Creek placement site, nine in all, because of stability concerns (tr. 4/147- 49). Laboratory analyses were performed on some of these samples (tr. 4/150). The Corps considered taking borings on McMillan Island as insurance against a claim, but decided, due to the cost, that the information

obtained from the perimeter of the island alone was "adequate" (R4, tab 6, attach. 3; tr. 3/74-79, 4/151-52).

Bay West's Bid

Bay West's bid for the excavation/dredging portion of the work, including the choice of dredging equipment, was prepared predominately by Mr. Roland Maturin who had substantial dredging experience, the vast majority of which had been on contracts with the Corps (ex. A/G-6 at 7-13, 26). He was assisted to some extent by Mr. David Schlenker, Bay West's manager of marine services, and Mr. Bradley Kulberg, Bay West's estimator (tr. 2/10-11, 110, 112, 3/29-30). The bid was reviewed and signed by Mr. Martin Wangensteen, Bay West's vice president of operations (tr. 1/27, 98).

Mr. Maturin considered the solicitation to be "pretty straightforward" (ex. A/G-6 at 26). With respect to paragraph 3.4 of specification section 02323, he thought there would be "very little" debris in the sand pile because the material previously had been dredged by the Corps. He thought that stones would be of a size he would be able to throw, approximately one inch in diameter, and anticipated some wood debris. (*Id*. at 40, 49-51, 57) He found no snagging contracts and talked to a former employee of Matteson who told him that there was not much trash and that wood debris had not been a problem in a similar dredging project Matteson had performed for the Corps about 50 miles north of McMillan Island (*id*. at 38).

Mr. Maturin reviewed the boring logs, which indicated to him that the material to be dredged was "basically soft clay," and relied upon the soil descriptions to the right of the boring staffs because it was the best information he had. He and Mr. Kulberg calculated what they concluded would be a small percentage of clay on the project for bidding purposes. He did not take into account the reference to medium stiff clay in Note 2 because there was no corresponding notation in the soil descriptions, but would have considered it to be a "catchall" had there not been specific material descriptions. Thus, Bay West did not interpret the contract documents as indicating that it would encounter either medium stiff or stiff clay. (Ex. A/G-6 at 29-30, 43, 45-46, 55-56, 61-63)

Mr. Gail G. Gren, a former Corps employee who testified as an expert dredging witness on behalf of Bay West, did not understand the reference to medium stiff clay in Note 2 because it had not come from the data on the boring logs. In his view, the information to the right of the staff should be "gospel" and "what you go by" and he would not have considered the note as a bidder. (Tr. 3/163-64, 180-81) He acknowledged, however, that a bidder could have asked what the note meant and whether it had any validity in order to avoid making an assumption (tr. 3/182). Dr. Jack Fowler, a civil engineer specializing in geotechnical engineering and soils mechanics, and a former Corps employee with extensive experience relating to the material descriptions of draft

dredging specifications, was also called as an expert witness by Bay West. He explained that in his experience, contractors look at the depth of the cut and then at the information adjacent to the staff for the applicable area and the notes and discount the notes if the information in them is not as described on the staff. (Tr. 4/12-18, 117-18)

Although Mr. Maturin was generally aware of the possibility that a surcharge from the pile of sand could cause consolidation of the underlying clay, he relied upon the contract documents provided by the Corps as he always had done in the past because he is not a soils expert and the logs were the best information he had (ex. A/G-6 at 54-56). Mr. Wangensteen was similarly aware that a pile of sand on top of clay could cause consolidation (tr. 1/100).

Neither Mr. Maturin nor Mr. Kulberg actually went to McMillan Island. Mr. Maturin observed the work site from the Iowa side of the Mississippi River. He could see the mound of sand, the route for the discharge pipe and the proposed disposal site. He did not make any independent assessment about the height of the sand pile and did not include the possibility of any consolidation effect from the sand in his computation of Bay West's production rate. (Ex. A/G-6 at 26-27, 54) Mr. Kulberg observed the site from Essman Island, which is also on the Iowa side. He could not see the entrance to the island on the downstream (Wisconsin) side that would be used by the dredge and where steel risers/rusted pipes were visible. (R4, tab 12 at 13, tab 13(H); tr. 1/76-77, 201, 3/26, 5/144-45)

Mr. Maturin based the bid upon use of Bay West's Ellicot 370 hydraulic dredge which had a 29-inch diameter cutter head and a 10-inch discharge pipe. He had used the dredge on four prior projects. (Ex. A/G-6 at 130) The dredge needed only three feet of draft and Mr. Maturin thought it was the best-suited dredge for the project (*id.* at 16-17, 22-23, 129, 136-37). There was evidence that a larger dredge with a 16-inch discharge pipe would have permitted higher production rates, but it also would have required more draft and would have pumped at too great a speed for the small area designated as the placement site (tr. 5/12, 30-32). We find nothing inappropriate about the selection of the Ellicot 370 hydraulic dredge.

Based upon the published production rate charts for the Ellicot 370, a book published by a dredging consultant, and his own experience, Mr. Maturin estimated a production rate of 250 cubic yards per hour, basically for the sand, and about half of that number, 125 or 150 cubic yards per hour, for what he believed would be a small amount of clay. The rate actually bid was 230 cubic yards per hour. (Ex. A/G-6 at 22-23, 41-45; tr. 3/30) The dredging plan was to undercut the island with the cutter head and use water cannons to feed sand from the sand pile to the dredge (ex. A-4; tr. 1/29-30, 49). We find nothing unreasonable about the production rates for sand and clay or the basic dredging plan.

Paragraph 3.9.2, "Quantity Surveys" of the GENERAL specifications required Bay West to perform quantity surveys (R4, tab 2, § 01000-7). Bay West performed a pre-dredging survey on 9 July 2002 which showed that a total of 182,230 cubic yards of material would have to be dredged from McMillan Island (R4, tab 6, attach. 12 at 1 of 9).

Contract Option

Section 02325, DREDGING, contained the specifications for a contract option for maintenance dredging of the Mississippi River at the McMillan Island channel cut. Paragraph 1.2, REFERENCES, identified a 1996 St. Paul District publication entitled "Channel Maintenance Management Plan" (CMMP) as part of the dredging specification "to the extent referenced." (R4, tab 2 at 02325-1) It is not referenced in the section 02323, EXCAVATION OF DREDGE MATERIAL, specifications. The CMMP includes ten pages of detailed spreadsheets that apparently reflect the various locations at which the material dredged in the upper Mississippi River and its tributaries has been placed over a period of many years. There are codes on some of these spreadsheets that indicate hydraulic dredging of the material placed on McMillan Island in 1995 and 1996 and mechanical dredging of the material placed there in 1997, 1998, and 1999. (R4, tab 15 at 29-38; tr. 5/84-85, 87-89) The CMMP states that the Dredge Thompson, which belonged to the Corps, had been used for hydraulic dredging operations and explains that hydraulic dredging is best suited to maintenance work to remove sediments, but that mechanical dredging can be used when there is a small amount of material to be removed or there are difficulties with the placement site (R4, tab 15 at 22-23). No bidders have ever asked to review the CMMP (tr. 5/93).

On 24 July 2002, the Corps issued Modification No. P00005 in the amount of $279,000.00, exercising the option for maintenance dredging of approximately 20,000 cubic yards of material from the channel cut and increasing the total contract price to $1,742,504.00. In accordance with paragraph 1.6.1,"Optional Bid Items," of section 01270, MEASUREMENT AND PAYMENT, Bay West was directed to perform this work before beginning dredging at McMillan Island. On 23 August 2002, the Corps issued Modification No. P00007 instructing Bay West to suspend channel dredging and mobilize its operations for McMillan Island. (R4, tab 2)

Debris

Bay West began dredging the pre-existing virgin material at the entrance to McMillan Island on 24 August 2002. It also began working a two shift, 24-hour operation, although that had not been its original plan. (R4, tabs 8(C), (E); tr. 1/47, 5/22-23, 140) This was where the logs and roots, but not other debris, should have been expected (tr. 5/22-23). Mr. Shawn Finn, who had approximately six years of leverman

and supervisory experience, was the on-site project superintendent for Bay West (tr. 1/121-23). The operational crew was experienced (ex. A/G-6 at 133). Mr. Maturin remained involved as the troubleshooter, project engineer and was responsible for making recommendations regarding productivity (ex. A/G-6 at 18-22; tr. 2/61-62). He consulted with Mr. Finn and other on-site personnel on a daily basis and made bi-monthly visits during which he stayed on-site for a week (ex. A/G-6 at 65; tr. 1/125).

Bay West's Daily Report of Operations (Daily Report) for 25-26 August 2002 establishes that it encountered what is described as a "wall of sandbags." Its Construction Quality Control Management Report (CQC Report) for 26 August 2002 states: "Ran into a sandbag levee that appears to extend the length of the cut (85 ft). The levee contains burlap bags and clear plastic." The Corps Daily Log of Construction-Civil (Daily Log) for 29 August 2002 also indicates Bay West encountered sandbags. The QCQ and Daily Reports for 30 August 2002 contain comments about rocks creating a blockage. (R4, tab 9) Further references to sandbags, plastic and rocks are contained in the QCQ, Daily and Leverman Reports throughout September and into October 2002. Messrs. Finn and Schlenker estimated respectively that there were "a couple of hundred" and "hundreds" of sandbags (tr. 1/135, 2/19).

Mr. Wangensteen visited the site on 6 September 2002, after which he telephoned Ms. Melissa Gulan, the Corps' Administrative Contracting Officer, and told her about the debris and what appeared to be a man-made structure in the sand pile. She directed him to continue dredging pending an investigation. (Tr. 1/41-42) She then called Mr. Mark Paschke, an inspector whom the Corps considered to be reliable and accurate in his reports, and asked him to look at the debris Mr. Wangensteen had described to her (tr. 5/192, 194-96). Mr. Paschke recorded his observations in a Daily Log dated 6 September 2002 as follows:

> I arrived at the dredge and observed 15 to 20 pieces of riprap scattered on the sand slope below the face of the stockpile. The riprap was mixed in with sandbags and pieces of plastic. After blasting with the water cannons for an hour, additional riprap and sandbags were exposed. Some of the riprap was piled together giving the impression of a wall of rock. Dredging production is only slightly affected when the cannons are reduced to allow clean-up.

(R4, tab 9)

Also on 6 September 2002, Mr. Wangensteen provided photographs of the site by email both to Ms. Gulan and Mr. Scott Baker, the Contracting Officer's Representative (R4, tab 12 at 8). Additionally, he sent to Mr. Baker a formal notice of an alleged

differing site condition consisting of "heavy plastic sheeting, a large number of sandbags, and an inordinate amount of large rocks" (R4, tab 6, attach. 1). Mr. Wangensteen forwarded more photographs to Mr. Baker by email on 11 September 2002 (R4, tab 12 at 26-29). The various photos exemplified the type of debris that Bay West encountered (tr. 1/130-34, 2/16-18, 118-19).

The evidence established that the sandbags were intertwined with plastic sheeting and rocks that ranged in size from a little larger than a fist to as much as two and one-half feet in diameter, with variable weights as heavy as 35-50 or 60 pounds, or more. Bay West personnel thought the rocks had been placed among and related to the sandbags and plastic as part of a man-made structure. Sometimes the rocks and debris were concentrated and sometimes the debris had been washed down from the sand pile, with the rocks washing out first. (R4, tab 6, attach. 5, tabs 9, 13(M) (photographs); ex. A/G-6 at 56-57, 113; tr. 1/31-33, 35-41, 81-84, 111-12, 129-34, 141-42; 2/9, 14) Bay West personnel thought that these rocks were larger than stones, and described them as "substantial" (ex. A/G-6 at 50-51; tr. 2/63, 3/219, 230-31).

By a letter dated 12 September 2002, Mr. Baker advised Bay West that its differing site condition allegation was without merit. He relied principally upon "key points" in paragraph 3.4 of specification section 02323 which provided that the contractor was responsible for determining the character of the existing material, that the dredged material might contain stones, rubble, wire rope, stumps and trees from snagging operations and other debris and that the contractor was responsible for making a determination of the characteristics of the native soils. (R4, tab 7(M))

Mr. Baker subsequently learned that the steel risers/rusted pipe on the downstream bank of McMillan Island had been removed from a drop structure on the island and placed on the bank in 1997 by a mechanical dredging contractor at the direction of the Corps. The sandbags, however, had not been removed. (R4, tabs 7(CC), (DD), tab 8(K), tab 12 at 1; tr. 5/95-98, 197-200).

The record contains conflicting evidence and speculation as to when the drop structure was placed on McMillan Island, by whom and for what purpose, whether the rocks/riprap were part of the drop structure, and whether rocks/riprap are used with sandbags and plastic in drop structures constructed by the Corps (R4, tab 7(K); ex. A/G-6 at 120-121; tr. 2/23-24, 135-38, 3/154-55, 5/104-07, 116-17). There was no persuasive evidence that a bidder should have known that the steel risers/pipe on the McMillan Island shoreline had been removed from a pre-existing drop structure, much less that the sandbags, plastic and possibly rocks/riprap had not been removed and remained where the drop structure had been constructed (tr. 3/207-08).

Bay West personnel collected many of the rocks and some of the debris and placed it in stockpiles (tr. 1/110-12, 195-98). There were a variety of estimates as to the total quantity of debris encountered. From these estimates and the photographs, we find that Bay West encountered more than a minor amount of debris. (Tr. 1/194-97, 3/157-59, 5/76-77, 159; R4, tab 12 at 15, 26, 27, 29, 36-38, 42) Further, the record is clear that rocks, sandbags and plastic material snagged on the cutterhead teeth and that the sandbags and plastic sometimes got into the pump and had to be cleaned out by hand, either or both of which caused Bay West to shut down the dredge for various periods of time. (R4, tab 6, attach. 5 (photographs), tab 9 (Daily and CQC Reports and Daily Logs), tab 14 (Leverman Reports); ex. A/G-6 at 118; tr. 1/40, 135-41, 2/20-23) There also was evidence that the rocks caused a hydraulic line to break (tr. 2/20, 35).

Not every shutdown, however, was due to the rocks, sandbags and plastic material (R4, tab 14). There were also shutdowns due to maintenance and repair throughout contract performance (R4, tabs 9, 14). The Corps provided a computation of these hours as Attachment 1 to its post-hearing brief (gov't br. at 28). Attachment 1 is not part of the evidentiary hearing record. Further, it appears to be based solely upon the Leverman Reports and lacks any explanatory or authorship evidence from which we can evaluate either its accuracy or whether the number of hours reflected by it fall within the range of maintenance and repair shutdowns typically experienced by dredgers.

Stiff Clay

The CQC and Daily Reports for 24 and 25-26 August 2002 and the Corps' Daily Log for 28 August 2002 show that Bay West had to remove seven feet of clay and encountered a clay and root layer when it began dredging at McMillan Island (R4, tab 9). The Leverman Report for 31 August 2002 contains the following entry: "NOTE: Cutting Clay, Roots & Logs." The reference to cutting clay continues in the Leverman Report for 1-2 September 2002 (R4, tab 14). Mr. Maturin initially thought that this was an isolated incident and that the clay had been compressed and compacted in conjunction with the construction of a retention dyke. He expected that the clay would be as represented in the boring logs once Bay West broke through the dyke. (R4, tab 9; ex. A/G-6 at 89-92) Production improved temporarily on 28 August 2002, but Bay West continued to encounter some clay and roots, together with tree stumps and logs. The clay got harder as Bay West dredged into McMillan Island (tr. 2/44). This occurred at the same time it was encountering the rocks/riprap, sand, and plastic sheeting. (R4, tabs 9, 14; ex. A/G-6 at 91-92)

Bay West performed its first payment survey on 16 September 2002, the results of which it received on 20 September 2002. Because the dredging production rates were very low, Mr. Kulberg was dispatched to the site to investigate. He verified the production rates and provided this information to Mr. Baker. (Tr. 1/43-44, 2/113-15)

Bay West did not know why its productivity was so low (tr. 1/171). It began taking velocity tests and making equipment adjustments in an attempt to increase the flow of sediment and water to the disposal site (R4, tab 13(I); tr. 1/44-48, 172-73, 224-25, 2/115-16).

Meanwhile, the Daily Report for 20 September 2002 indicates that Bay West was cutting clay all day and the Corps' Daily Log for 25 September 2002 reflects that Mr. Baker discussed the production rates, the clay layer and the uncompacted material under the clay with the leverman. The CQC Report for 27 September 2002 makes reference to "dug out the clay sill beneath the wall of sand." (R4, tab 9) As the water cannons washed the sand down, the face of the sand pile receded away from the dredge because the forward dredging progress was impeded by the clay (ex. A-4; tr. 1/49-50, 3/162). Mr. Maturin decided to use an excavator to remove as much clay as possible so that the dredge could get to the sand, but the excavator had difficulty breaking the clay because it was so stiff, and he decided to use the excavator to push the sand to the dredge first, and then break up the clay (ex. A/G-6 at 107-08; tr. 1/173-74). Use of the excavator to throw sand from the top of the pile down to the dredge is first noted in the CQC and Daily Reports for 28 September 2002. This improved production and the Corps' Daily Log for 2 October 2002 further indicates that leverman told Mr. Baker that the excavator enabled the cutterhead to access uncompacted material. (R4, tab 9; tr. 1/174)

The Leverman Report dated 4-5 October 2002 states: "18:00 – CLAY DIG." (R4, tab 14) The CQC Report for 4 October 2002 states:

> Boring log for samples taken on McMillan 01-7M, 01-8M and 01-9M indicate clay/organic material is very soft. Actual material is very hard packed, which is very hard to cut and frequently clogs the cutterhead. Unable to get enough material when in clay to load the line.

(R4, tab 9) A copy of this report was sent to Mr. Baker by email (tr. 5/172). The statement is repeated in several of the subsequent CQC Reports (R4, tab 9).

A number of the CQC and Daily Reports prepared shortly after 4 October 2002, make references to cleaning clay and debris from the cutterhead and pumps, the taking of slurry samples to determine what the leverman is dredging, and adjusting the weir boards because of the clay (R4, tab 9). Several of the Leverman Reports during this period refer to dredging/digging clay (R4, tab 14). Clay is more difficult to cut and pump than sand; in short, it is more difficult to dredge and resulted in lower production rates (ex. A/G-6 at 41, 45; tr. 3/31, 4/160, 165-68, 5/14-15, 17, 25).

As he had promised in a 4 October 2002 letter, Mr. Wangensteen advised Mr. Baker of efforts to improve Bay West's production rate by a letter dated 9 October 2002. After eliminating any operational or equipment causes, he concluded that Bay West was being "significantly hampered" by a hard, very stiff clay material beneath elevation 612, the composition of which was causing the cutterhead to have difficulty cutting it to the point of stopping the cutterhead rotation. He explained that Bay West had experienced only "limited success" with excavating the clay and that the difficulty in cutting through the "dense clay layer" had hindered the ability of the water cannons to wash the sand to the dredge. (R4, tab 13(I); exs. A-4, A/G-6 at 88, 105-07; tr. 1/49-51, 173, 2/115-18) He proposed using a bulldozer to push the sand to the dredge until only a few feet of sand remained on top of the clay (R4, tab 13(I)).

By a letter dated 10 October 2002, Bay West gave formal written notice to the Corps that the "extremely hard and compacted clay" it was encountering differed materially from the subsurface conditions indicated in the contract boring logs (R4, tab 6, attach. 9). Bay West began using a bulldozer to push sand to the dredge after it arrived at the site on 15 October 2002. It pushed the sand from the sand pile across the plateau that had been created above the layer of clay after the face of the sand pile had receded from earlier dredging. This increased productivity substantially. (R4, tab 9; ex. A/G-6 at 69, 107; tr. 1/52-53, 174, 2/32, 162, 5/176) The Corps' Daily Log for 22 October 2002 states that the bulldozer broke down and Bay West resumed "mining" the clay in order to get to the sand to feed the dredge (R4, tab 9).

Between 24 and 28 October 2002, the Dredge Thompson performed channel cut dredging work that had been suspended by Modification No. P00007. The channel material was discharged on McMillan Island. On 25 October 2002, a new bulldozer arrived at the site and Bay West used it to continue pushing sand to the dredge. On 5 and 6 November 2002, the bulldozer stockpiled sand at the waterline when the dredge was not operable. Thereafter, until the 24 November 2002 pay survey was performed, sand from both the original McMillan Island sand pile and the channel dredging performed by the Dredge Thompson and a mechanical dredging contractor, Lametti & Sons, was continuously pushed to the waterline by bulldozer and stockpiled within reach of the water cannons that washed the sand down to the dredge. (R4, tab 9; tr. 2/161-64)

Stiff Clay Evaluations

The Corps retained Braun Intertec Corporation (Braun) to evaluate the soil conditions. On 24 October 2002, Braun went to McMillan Island to take samples of the clay material below elevation 612, but only was able to reach the upper clay layer with one hand auger boring. Braun also took samples from the teeth of the dredge. (R4, tab 7(S); tr. 5/187) The 15 November 2002 geotechnical report prepared by Braun indicates that the upper layer of the clay soil from the auger boring sample "would likely

be described as soft to medium" and that the values for samples from the teeth of the dredge indicated "medium to firm consistency." The report also contained an unconfined compression strength prediction based upon the Naval Facilities Engineering Command (NAVFAC)/Skempton soil mechanics formula from which Braun concluded that a sand pile 65 feet high would result in clay with medium to firm strength. (R4, tab 7(S); tr. 3/89)

Bay West also retained a geotechnical firm, Terracon, which took 16 soil samples from seven boring locations on McMillan Island. The samples were classified in accordance with the Unified Soil Classification System, using both visual-manual procedures and laboratory test results. Terracon issued a report dated 22 November 2002 which concluded that all three samples tested from the first boring were stiff; one sample from the second boring was stiff, another was on the line between stiff and medium (firm) and the third sample was medium (firm); the only sample from the third boring was medium (firm); one sample was stiff and one medium (firm) from the fourth boring; all three samples tested from the fifth boring were stiff; one sample was on the line between stiff and medium (firm) and the other sample was medium (firm) from the sixth boring; and one sample was stiff and one was soft from the seventh boring. In sum, five of the seven borings produced samples that were stiff, one produced a sample that was on the stiff/medium (firm) line and one produced a medium(firm) sample. Nine sample tests were classified stiff, two were on the line between stiff and medium (stiff), four were medium (stiff), and only one was soft. (R4, tab 6, attach. 10)

Mr. Baker consulted Mr. Douglas Crum, a Corps geotechnical engineer, who reviewed the Braun and Terracon information and advised Mr. Baker that he thought Bay West should have recognized that the sand pile would consolidate the clay and should have been able to approximate the level of stiffness based upon assumptions about the height of the sand pile, plasticity of the clay, distribution of the sand and how long it had been in the pile (R4, tab 7(X); tr. 3/110-15).

On 6 December 2002, Mr. Baker advised Bay West that he had concluded that there was not sufficient evidence of a differing site condition. He agreed with Bay West's characterization of the contract boring logs as indicating "soft to very soft, saturated clay," but pointed to Note 2 which identified the clays as "soft or med. dense." He conceded that the analyses performed by Braun and Terracon showed that the clay below elevation 612 was stiffer at the interior island locations than had been noted on contract boring logs. He explained that the difference was "directly related to the overburden pressure of sand material at locations on the interior of the island where the [Braun and Terracon] borings were taken." He concluded that the predicted unconfined compressive strength test performed by the Corps that is similar to the NAVFAC test approximated the results of the soil samples measured by Terracon and that "an experienced contractor should have anticipated these results and the method of operation selected for dredging or excavation should have been adjusted accordingly." (R4, tab 6,

attach. 11) The test referred to was the Mesri test, performed by Mr. Crum (R4, tab 7(X); tr. 3/89).

The NAVFAC/Skempton and Mesri test formulas are rough measures and can produce somewhat different results (R4, tab 16, ex. 51; tr. 3/89-90, 120, 4/21-23). The formulas are used by geotechnical design engineers and not by dredgers preparing bids (tr. 4/23), and are not as good as the tests performed by Terracon (R4, tab 16, ex. 51).

Mr. Crum did not perform a predicted strength analysis for McMillan Island when he prepared the Corps estimate for the contract work (tr. 3/104-05). Dr. Fowler thought that some dredging contractors might know that a sand pile such as that on McMillan Island might cause consolidation, but that others might not. He would not expect a dredging contractor to make assumptions about the possible impact of a surcharge on the stiffness of clay, to understand geotechnical issues pertaining to consolidation dynamics, or to use the NAVFAC/Skempton or Mesri formulas. (Tr. 4/8, 50-51, 57-58, 113-14) Mr. Gren thought a contractor might recognize surcharge and assume consolidation to some degree, but not to the extent that the material would be firm. Like Dr. Fowler, he also would not expect a dredging contractor to use strength prediction formulas. (Tr. 3/172-74, 189)

Mr. Robert Gross has been a dredger for 20 years and is the assistant master of the Dredge Thompson. Mr. Gross was called as an expert dredging witness by the Corps. It was his view that an experienced dredger should expect consolidation of clay under 40 to 60 feet of sand and that the clay under the sand pile would be stiffer than the clay around the sand pile. He did not know, however, how much stiffer it would be and did not have any experience with such conditions. (Ex. G-2; tr. 4/153-55, 164-66, 182-87) Mr. Victor Buhr has 25 years experience in the dredging industry and did not bid the job for reasons that are not relevant to the claims at issue here. He was also called as an expert dredger by the Corps. Mr. Buhr thought that the sand pile would tend to consolidate the clay and guessed that the material would be denser, but could not be sure without testing. However, he would not have taken soil borings in a sand pile such as was present on McMillan Island. (Tr. 5/13, 27-30) Mr. Gren and Dr. Fowler agreed that bidders on a project such as this typically would not have taken their own soil borings (tr. 3/169, 4/119).

Neither Mr. Gross nor Mr. Buhr gave any testimony about Note 2 under the boring logs for 01-7M, 01-8M and 01-9M on Contract Drawing No. M-P10-10/026. Mr. Neil Schwanz, a Corps geotechnical design engineer with very little exposure to dredging projects and no actual dredging experience, reviewed Bay West's differing site condition claim for Mr. Baker. In a 14 May 2003 email to Mr. Baker, he included his general views that Note 2 qualified the boring staffs as part of the information obtained from the soil boring process and that, while consolidation was predictable, the magnitude

of the difference in the density and strength is difficult to predict. (Ex. G-3; R4, tab 16, ex. 51; tr. 5/37, 54-56)

Mr. Maturin was of the view that Bay West encountered stiff clay throughout its dredging of McMillan Island, but did not recognize that it was a differing site condition for about four weeks (ex. A/G-6 at 88-89, 91-92). The normal learning curve associated with a new project usually runs about three weeks or a month, although Mr. Maturin thought that it might have been longer on this contract because of the type of material encountered (ex. A/G-6 at 30-31, 47, 95-96, 131-32; tr. 1/206, 3/226-29).

Mr. Kulberg prepared a graph analysis entitled "Percent Effective Dredging Time in 24-Hour Day" of the effective dredging time during a 24-hour day beginning on 16 August 2002, when Bay West began dredging the channel cut. The analysis indicates that, after 5 September 2002, Bay West was achieving between 40 and 80 percent effective running time, an average of about 50 percent which it maintained through the balance of performance in 2002. (R4, tab 13(I); ex. A-5; tr. 2/194-96, 3/68-72) There was no evidence of industry averages against which to compare Bay West's effective running time. Mr. Kulberg also characterized this graph as a learning curve from which he concluded Bay West's learning curve ended on 5 September 2002, when it reached a 50 percent average running time (ex. A-5; tr. 3/66-69). We decline to adopt Mr. Kulberg's conclusion on this issue because he has not had any training in learning curve analysis and conceded that his graph did not provide information about how efficiently the equipment was being used when it was running or its related productivity (tr. 3/71-72).

Modification No. P00010

Paragraph 3.5.2, "Initial Placement Limit," of the GENERAL specifications contained in section 01000 provided that placement of material from McMillan Island on the Heitman property and Buck Creek placement sites be limited to an initial height of 640.0 +/- 0.5 feet for a period of not less than six months and that the Heitman site could be used to temporarily place excess excavation or dredge material above the finished grade shown for the six month period, after which excess dredge material was to be moved to the Buck Creek placement site and final shaping to finished grades accomplished (R4, tab 1, A0001 at 2, tab 2). The parties agree that this provision did not require placement to 640 feet (tr. 3/19-20).

Bilateral Modification No. P00010 was issued on 5 December 2002, extending the interim completion date by 17 days to 20 December 2002, and providing that dredge material be placed at "the Buck Creek site to elevation 640 +/ -0.5 over the entire area shown to be at final elevation 655.00" on Drawing No. M-P10-60/007 by 20 December 2002 (R4, tab 2). The main purpose of the modification was to change the requirements

for the interim completion date because Bay West was not going to meet it (tr. 2/140-42). According to Mr. Wangensteen, Bay West would have met the interim completion date if it had not experienced lower productivity due to the stiff clay. Bay West moved and reshaped the sand to the 640 elevation at the Buck Creek placement site as required by Modification No. P00010. (Tr. 1/56-57, 3/20-21)

Modification No. P00010 further provided, however, that any additional work was to be performed at Bay West's expense, that operations for 2002 could be shut down when sufficient material had been placed to reach 640 feet, and that Bay West would not receive payment for remobilization unless it was recoverable as part of the pending differing site condition request for an equitable adjustment. The modification contained the following release:

> The contractor hereby releases the government from any and all liability under this contract for further adjustments of any kind, including time or money, as a result of this modification and the changes made herein. . . . This release also includes any claim for time or money by the contractor . . . as a result of impacts to unchanged work caused in whole or in part by this modification. However, nothing in this release shall preclude the contractor from making a claim or receiving an adjustment in contract time or price as a result of the contractor's pending request for [debris and stiff clay differing site condition] adjustments . . . .

(R4, tab 2) Ms. Gulan, who negotiated, but did not sign the modification, did not think the modification had anything to do with the pending differing site condition issues and stood on its own. She recalled that the pending differing site condition adjustment requests were excluded from the release at the insistence of Bay West. (Tr. 2/144, 156-57) Mr. Wangensteen, on the other hand, did not think he was waiving any right to recover costs associated with moving the material to elevation 640 if Bay West's stiff clay claim was found to be valid when he signed the modification because Bay West would not have been performing the work but for the impact of the clay on its operations (tr. 1/110, 115).

Bay West returned to McMillan Island in the spring of 2003 to complete the dredging, resulting in additional mobilization costs for the dredge and heavy equipment, including large backhoes and excavators which were used to excavate the clay instead of dredging it (tr. 1/57-58). It continued using a bulldozer to shove the sand to the dredge (R4, tab 8(K)).

Bay West's Claim

By a letter dated 6 February 2003, Bay West submitted to the contracting officer a certified claim for alleged debris and stiff clay differing site conditions (R4, tab 6). When the contracting officer advised that a decision would be issued not later than 8 August 2003, Bay West filed an appeal from a deemed denial on 16 April 2003 (R4, tab 1).

With respect to the debris differing site condition claim, Bay West sought $178,998.95 for 97 hours of impact due to debris, at an hourly dredge rate of $1,845.35 (R4, tab 6, attach. 8). On 14 March 2005, the Corps issued unilateral Modification No. P00019 in the amount of $2,411.84 as compensation for 155 minutes of downtime that it attributed to blockages experienced by Bay West caused solely by sandbags and plastic sheeting under an alleged superior knowledge theory. There was no evidence explaining how Modification No. P00019 was prepared or by whom. (R4, tab 17)

Bay West reduced its debris impact to 47.11 hours at the hearing (tr. 2/75-76, 79-80). Mr. Finn testified that he prepared the Daily Reports (and many of the CQC Reports), combining information contained in the Leverman Reports, his own observations in the field, and discussions with the foreman and levermen (R4, tabs 9, 14; tr. 1/153-54). Using the Daily Reports, supplemented by the Leverman Reports as needed, for the period beginning 26 August 2002 and ending 26 October 2002, he credibly explained in detail how he had determined that Bay West incurred 47.11 hours of down time due to unanticipated debris consisting of rocks, sandbags and/or plastic. He used the Leverman Reports for 8 September and 3-26 October 2002, during the latter of which there were only 5.75 hours of downtime. He excluded "normal" debris, *i.e.,* debris that would have been anticipated, but included anticipated and unexpected debris when it was encountered together, if appropriate. (R4, tab 6. attach. 7, tabs 9, 14; tr. 1/128, 145-46, 149-52, 154-69, 216-17) We find his analysis of the 47.11 hours of impact from unanticipated debris to be reasonable.

With respect to the stiff clay differing site condition claim, Bay West seeks $1,145,059.64, consisting of: 395.9 hours of dredging impact at $1,823.74 per hour ($722,018.67) from 24 August through 14 October 2002; 32.3 hours of dredging impact at $1,788.42 per hour ($55,765.92) from 15 October 2002 through 6 November 2002; $27,443.00 for bulldozer operations from 7 through 25 November 2002; $134,586.00 for placement of dredged material to the 640-foot elevation; $65,550.00 for demobilization/remobilization; $74,696.00 for equipment during 2003; and approximately $65,000.00 for investigation and claim preparation (R4, tab 6, attach. 17).

An analysis of the extent to which the planned production rate was impacted because of the stiff clay was performed by Mr. Kulberg using a measured mile approach

based upon the Daily Reports and pay surveys and included in Bay West's claim. Mr. Kulberg divided contract performance into three time periods: 24 August through 14 October 2002, when Bay West was using water canons and dredging sand and clay; 15 October through 6 November 2002, when Bay West was using bulldozers to push the sand to feed the dredge; and 7 through 25 November 2002, when Bay West was using the water cannons and dredging the stock pile of sand that had been created by the bulldozers from the original temporary dredge sand pile and the channel dredging performed by the Dredge Thompson and Lametti & Sons. (Ex. A-4; R4, tab 6, attach. 16; tr. 2/160-65) The Defense Contract Audit Agency (DCAA) verified his methodology (tr. 3/65-66).

The Corps offered approximately 25 proposed findings of fact which relate to dredging productivity that apparently are based upon the Daily and Leverman Reports and incorporate selected data from Mr. Kulberg's analysis. It used preliminary proposed findings to form the basis for further proposed findings, which similarly build upon each other and themselves until the ultimate proposed findings are reached. There is virtually no testimony explaining these proposed findings, many of which also contain unsupported assumptions. (Gov't br. at 78-82)

Because Mr. Kulberg thought that the dredging conditions, essentially sand with no clay, in the third performance period, 7 through 25 November 2002, were similar to what Bay West had anticipated, he selected this "stockpile" period as the basis for his measured mile analysis (tr. 2/163-64). He computed a measured mile production rate of 246.8 cubic yards per hour (R4, tab 6, attach 16; tr. 2/165-66). The Corps also computed a measured mile production rate for this time period. Its rate was between 221.2261 and 219.3577 cubic yards per hour (which we round to 221.2 and 219.4). (Govt. br. at 49; R4, tab 9) We find that Bay West dredged at a rate between 219.4 and 246.8 cubic yards per hour during the measured mile production period.

Mr. Kulberg computed an average production rate of 96.7 yards per hour for 62,952 cubic yards of material for the first performance period, 24 August through 14 October 2002, his "water cannon" period. This is 651 hours of dredging. He concluded that it would have taken 255.1 hours to dredge this material at his measured mile rate, resulting in an impact of 395.9 hours attributable to the stiff clay. (R4, tab 6, attach. 16; tr. 2/167-71)

The Corps computed 65,650 cubic yards of material and a total of 652.1824 hours of dredging for this time period (gov't br. at 78-82). We find this is an average of 100.7 yards per hour. The Corps also computed an average of 85.39 cubic yards per hour for the period 24 August to 16 September 2002 and an average of 115.5382 cubic yards per hour for the period 16 September to 3 October 2002, for an average of 97.85 cubic yards per hour for the period 24 August to 3 October 2002 (gov't br. at 51). Additionally, it computed a so-called "post-learning curve" production rate of 115.5375 cubic yards per

hour for the period 3 through 14 October 2002, which it used to assert that Bay West would have dredged 568.21 hours during the period 24 August through 14 October 2002. Using its measured mile production rates, it concludes that the resulting impact for the water cannon period is no more than 268.93 to 271.45 hours. (Gov't br. at 79-82)

Mr. Kulberg computed an average production rate of 220.5 yards per hour for 66,856 cubic yards of material for the second performance period, 15 October through 6 November 2002, his "dozer" period. This is 303.2 hours of dredging. He concluded that it would have taken 270.9 hours to dredge this material at the measured mile rate, resulting in an impact of 32.3 hours attributable to the stiff clay. (R4, tab 6, attach. 16; tr. 2/172-73)

The Corps did not compute an average production rate for this period. However, when added and rounded, the number of dredging hours it cites (114.8332 and 188.3292) agrees with Bay West's 303.2 hours. The number of cubic yards of material dredged it cites (25,319 and 41,524) equals 66,843 cubic yards. (Gov't br. 79-81) We find that this is an average production rate of 220.5, the same rate computed by Bay West. Using the Corps' measured mile production rates, there is either no impact or one hour of additional dredging during the dozer period.

DISCUSSION

Bay West asserts that it encountered debris and stiff clay Type I differing site conditions. The Court of Appeals for the Federal Circuit stated in *Comtrol, Inc. v. United States*, 294 F.3d 1357, 1362 (Fed. Cir. 2002):

> To establish entitlement to an equitable adjustment due to a Type I differing site condition, a contractor must prove, by preponderant evidence that: the conditions indicated in the contract differ materially from those actually encountered during performance; the conditions actually encountered were reasonably unforeseeable based on all information available to the contractor at the time of bidding; the contractor reasonably relied upon its interpretation of the contract and contract-related documents; and the contractor was damaged as a result of the material variation between expected and encountered conditions. *H.B. Mac, Inc. v. United States,* 153 F.3d 1338, 1345 (Fed.Cir.1998).

The Debris Claim

Contract Indications

The contract documents contained a number of indications about the subsurface conditions in the sand pile above elevation 612. Paragraph 3.4 of specification section 02323 explained that McMillan Island was "composed primarily of dredged material piles placed through previous dredging operations" and stated that the material to be relocated above elevation 612 "can be assumed to consist of predominantly previously dredged sand from the river channel." The plan and section views on Contract Drawing No. M-P10-60/003 were entitled: "MCMILLAN ISLAND DREDGED MATERIAL PILE" and "DREDGED MATERIAL PILE," respectively, and Note 3 stated that 68,400 cubic yards of "DREDGE SAND" and "SAND" had been placed on the island between 1997 and 1999. Additionally, paragraph 3.4 indicated that past dredging projects of temporary excavation piles had "encountered trees and some other minor amounts of debris" which bidders were further advised might include "stones, rubble, wire rope, stumps & trees from snagging operations, and other debris."

Conditions Encountered

When Bay West began dredging McMillan Island it encountered rocks/riprap, sandbags and plastic sheeting. We agree with Bay West that this material was materially different from the type of debris that was indicated by the contract documents and, further, that it was more than the "minor amounts of debris" the specifications indicated were to be expected.

The sandbags, plastic sheeting and most probably the rocks/riprap were the remains of a man-made drop structure. The Corps' insistence that these rocks were not riprap because it claims it does not use riprap in its drop structures is an argument intended to divert attention from the fact that Bay West encountered rocks/riprap in a sand pile that previously had been dredged. The rocks were found both mixed in with sandbags and pieces of plastic sheeting and by themselves after having been washed out of the sand pile. They were described as riprap by the inspector the Corps sent to investigate the alleged differing site condition. Who actually placed the rocks/riprap on the island and how they became mixed in with the sandbags and plastic sheeting is irrelevant to Bay West's differing site condition claim.

The Corps also contends that the specifications advised bidders that the previously dredged material might contain stones. It relies upon WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY, UNABRIDGED (1976) which defines "stone" as "1: a concretion of earthy or mineral mater of igneous, sedimentary, or morphic origin: a (1): such a concretion of indeterminate size or shape: BOULDER, PEBBLE . . . (2): the

substance of this concretion: ROCK" (gov't br. at 93). Bay West relies upon WEBSTER'S NEW UNIVERSAL UNABRIDGED DICTIONARY 1793 (2d ed. 1983), which defines a "stone" as "a piece of rock of relatively small size" and THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1270 (New College Edition 1980) which similarly describes a stone as "3. A small piece of rock" (app. reply at 2).

In the context of the contract documents, we are satisfied that the definitions relied upon by Bay West are more applicable and that it was reasonable for Bay West to have anticipated that the stones would be relatively small because the material had previously been dredged and was described as "DREDGED [OR] DREDGE SAND" and "SAND." The stones Bay West encountered ranged in size from that of a fist to two and one-half feet in diameter and weighed as much as 35-50 or 60 pounds, or more. Thus, irrespective of whether stones, rocks and riprap can be synonymous in some circumstances as the Corps contends, in the context of this case, the stones/rocks/riprap that Bay West encountered were not the same as the stones the contract specifications indicated might be present as debris in sand that previously had been dredged from the river channel. For the same reasons, the Corps' contention that the words "other debris" are broad enough to encompass sandbags, plastic sheeting and rocks/riprap also fails.

There was evidence taken from the CMMP that the sand pile on McMillan Island had been placed after both hydraulic and mechanical dredging. The Corps' suggestion that the material that was mechanically dredged might have contained rocks is speculation at best, particularly given Note 3 on Contract Drawing No. M-P10-60/003 and the frequency of the maintenance dredging. The same is true of its further contention regarding the possibility that large rocks could have passed through the pump of the Dredge Thompson. In any event, the information which forms the basis of these speculative arguments is buried within pages of detailed spreadsheets in the CMMP, which was referenced in the DREDGING specifications applicable to the optional channel dredging, not the EXCAVATION OF DREDGE MATERIAL specifications applicable to the relocation of material from McMillan Island. The record reflects that no dredger has ever come to the Corps office to review the CMMCP prior to bidding.

Foreseeability and Reliance

Mr. Maturin learned from his pre-bid investigation that there were no applicable snagging contracts and that neither trash nor wood had been a problem on a similar dredging project that had recently been performed nearby for the Corps. While he did not actually step foot on McMillan Island, we found that a bidder would not have known that the steel risers/rusted pipe on the bank of the island had been removed from a drop structure, much less that the sandbags, plastic sheeting and, most probably, the rocks/riprap that were also part of that structure had not been removed and were buried in the sand pile. Even Mr. Baker and Ms. Gulan were not aware that a drop structure had

been constructed on the island. Moreover, the record reflects that a substantial quantity of dredged sand was placed on McMillan Island after the risers/pipe had been removed from the drop structure and re-located on the bank. On these facts, we consider Bay West's site visit to be sufficient. *See Stock & Grove, Inc. v. United States*, 493 F.2d 629, 639 (Ct. Cl. 1974) (nothing more contractor could have reasonably done after site investigation to discover in advance conditions that materialized during performance). There was no probative evidence from which to conclude that Bay West would have foreseen it could encounter sandbags, plastic and rocks/riprap. Its reliance upon its interpretation of the contract was reasonable.

Resultant Injury

The rocks, sandbags and plastic snagged on the cutterhead teeth and sometimes got into the pump and had to be cleaned out by hand, both of which caused Bay West to shut down the dredge. While not every shutdown during the period was due to the rocks, sandbags and plastic, we are persuaded by Mr. Finn's credible testimony that Bay West incurred some 47.11 hours of downtime due to this unanticipated debris. In accepting his testimony, we reject the unexplained estimates prepared by the Corps in Modification No. P00019 and in Appendix 1 to its brief, the latter of which was not part of the evidentiary hearing record.

The Stiff Clay Differing Site Condition Claim

Contract Indications

The contract documents included three logs, 01-7M, 01-8M and 01-9M from borings that had been taken around the perimeter of McMillan Island. The soil descriptions to the right of the staffs of these boring logs indicated that the layer of clay between elevations 612 and 600 was "SILTY," "V. SOFT" or "SOFT" and "SATURATED." Additionally, Note 2 beneath the three boring logs indicated that standard penetration tests had not been taken and all clays were "SOFT OR MED. STIFF."

Paragraph 3.4 of specification section 02323 stated that the soils below elevation 612 were predominately native, that the borings taken around the perimeter indicated approximately "six feet of organic silty clay underlain by sands," and that the contractor was responsible for making a determination of the characteristics of the native soils at McMillan Island. The Physical Data clause advised bidders that the borings were within the area of work and were representative of the subsurface conditions at their respective locations, that variations were known to occur between borings and that normal variations would not be considered as differing site conditions.

Taken together, the three boring logs, Note 2 and paragraph 3.4 of section 02323 indicated that the material to be dredged below elevation 612 would be a layer of saturated, organic silty clay, the density of which would range from very soft or soft to medium stiff. The contract documents did not indicate the presence of any stiff clay. The Corps decided to forgo further exploration on McMillan Island in part because it thought the subsurface information obtained from the perimeter borings was adequate for bidders.

Conditions Encountered

The soil samples taken by Terracon on McMillan Island establish conclusively that Bay West encountered stiff clay. Nine of 16 test results of samples taken on McMillan Island described the clay as stiff and two more were on the line between medium (firm) and stiff. We are satisfied by the preponderance of the testimonial and record evidence, including the CQC, Daily and Leverman Reports and the Daily Logs, that Bay West encountered stiff clay beginning in late August as it began dredging its approach to McMillan Island and that the clay got harder as Bay West continued dredging into the island. This evidence establishes that Bay West was cutting and digging clay, that it was unsuccessful in its efforts to break-up the clay with an excavator, and that it encountered "very hard packed" material that was "very hard to cut" until mid-October when it changed its method of operation and began using a bulldozer to push the sand to the dredge, across the plateau that had been created above the layer of clay.

Bay West's production rates are also relevant to the issue. Between 24 August and 3 October 2002, Bay West only achieved an average production rate of between 96.7 (computed by Bay West) and 97.85 (computed by the Corps) cubic yards per hour. A portion of this low rate is due to the learning curve associated with a new project which should have lasted three weeks to a month. Here, as the Corps' calculations indicate, there was only a slight improvement after the normal learning curve should have been completed, an increase from 85.39 cubic yards per hour prior to 16 September 2002 to only 115.5382 cubic yards per hour from 16 September to 3 October 2002. Moreover, some of this improvement must be attributed to the use of the excavator to shove the sand to the dredge, first noted in the Daily Report for 28 September 2002. The Corps' computations reflect an average of 100.7 cubic yards for the entire water cannon period.

Thereafter, however, production improved significantly, to 220.5 cubic yards per hour, when Bay West began using the bulldozer to push the sand to the dredge during the dozer period, 15 October through 6 or 7 November 2002 It then began to stockpile sand that had been bulldozed from the sand pile and the accumulated discharge from the channel dredging performed by the Dredge Thompson and Lametti & Son and used water cannons to wash the stockpiled sand to the dredge, thus performing the work in a manner that was similar to its original plan. The production rates during this last, the stockpile,

period were between 219.4 or 221.2 (computed by the Corps) and 246.8 (computed by Bay West).

Notice of the Stiff Clay Differing Site Condition

The Corps asserts that Bay West failed to provide timely notice of its stiff clay differing site condition, resulting in prejudice. It contends that the lack of timely notice deprived it of the ability to demonstrate Bay West did not encounter stiff clay on 24 August 2002 and for sometime thereafter (apparently until 4 October 2002) and then to take remedial action.

The evidence established that Bay West thought that the stiff clay it encountered at the entrance to McMillan Island was an isolated incident. Almost immediately, Bay West also encountered the sandbags, plastic sheeting and rocks/riprap debris and the record reflects that its energies were focused upon resolving that issue until at least 6 September 2002, when Mr. Wangensteen sent a letter to Mr. Baker asserting a differing site condition. Indeed, it was not until 20 September 2002, when Bay West received the results of the first pay survey taken on 16 September 2002, that it learned how low its production rates were, at which time it dispatched Mr. Kulberg to the site to investigate. Mr. Kulberg shared the results of the survey with Mr. Baker and began exploring the possible causes for the poor production.

Meanwhile, a number of the written project reports make references to cutting and digging clay. Of particular note is the Corps' own Daily Log for 25 September 2002 which reflects that the leverman orally advised Mr. Baker that Bay West was digging through a layer of clay. Also of significance is the 4 October 2002 CQC Report which states that the boring logs indicated very soft clay/organic material but that the "[a]ctual material is very hard packed," a copy of which was sent to Mr. Baker by email.

By a letter dated 9 October 2002, Mr. Wangensteen advised Mr. Baker that, after eliminating any operational or equipment causes for its poor production, Bay West had concluded that it was being hampered by hard, very stiff clay it had encountered below elevation 612 and the following day Bay West gave formal, written notice of an alleged differing site condition.

The purpose of the notice requirement is to provide the government with the opportunity to investigate and exercise some control over the cost and effort associated with resolving the problem. *See Central Mechanical Construction*, ASBCA Nos. 29431 *et al.*, 85-2 BCA ¶ 18,061 at 90,658. Nevertheless, written notice requirements are not construed so technically as to deny legitimate claims where the government is otherwise aware of the operative facts. *Parker Excavating, Inc.*, ASBCA No. 54637, 06-1 BCA ¶ 33,217 at 164,630.

Here, the results of the 16 September 2002 survey and Mr. Baker's 25 September 2002 conversation with the leverman, together with the various reports referring to cutting and digging clay, all provided the Corps with information about the difficult dredging conditions before Bay West recognized that it was encountering a differing site condition. Actual notice of a differing site condition was provided to the Corps in the 4 October 2002 CQC Report and by Bay West's 9 and 10 October 2002 letters. In short, the government had much of the same information that Bay West had and was aware of the operative facts. It was also formally, and timely, notified of Bay West's conclusion that it had encountered a differing site condition when that conclusion was reached.

Moreover, the Corps did not undertake any investigation until 24 October 2002, at which time one boring reached only the upper layer of the clay. The Braun report of its geotechnical investigation of Bay West's alleged differing site condition was not provided to the Corps until 15 November 2002. Given the lack of information obtained from its own investigation, it seems doubtful that the Corps would have been able to recommend remedial action until after it received the report Bay West obtained from Terracon on 22 November 2002. This was only a few days before dredging was suspended for the winter.

In any event, the remedial action the Corps asserts it would have proposed, use of a bulldozer to push the sand to the dredge, is similar to the remedial action Bay West had first employed in September when it began using an excavator to shove the sand in an attempt to increase production. It is also the very same action that Bay West had proposed in its 9 October 2002 letter when it determined it had encountered a differing site condition and had already implemented before the Corps ever took its single boring sample.

The burden is on the Corps to prove a lack of timely notice and resultant prejudice. *See Parker Excavating*, *supra,* 06-1 BCA at 164,630. It failed to prove either.

Foreseeability

The Corps asserts that it should have been foreseeable, even expected, that the clay under the sand pile would be stiffer than clay not subjected to a surcharge (gov't br. at 119-20). The pile of previously dredged sand had been placed on McMillan Island over a period of several years. The contract documents provided information as to when that had occurred and a topographical map. Although the topographical information was not sufficient to permit bidders to determine the height of the sand pile at any particular point, the sand pile was visible from Bay West's site investigation. In these circumstances, we are persuaded that a reasonably competent dredger would understand that there likely would be some degree of consolidation to the clay underlying the sand

pile. *See Stock & Grove, supra,* 493 F.2d at 637. Messrs. Maturin and Wangensteen both acknowledged such a possibility, but did not make any adjustment in Bay West's bid to account for a clay that might be stiffer than that represented in the boring logs. The testimony of the other witnesses with dredging expertise similarly established that there would probably be some consolidation of the underlying clay, but no one, including geotechnical witnesses, was willing to speculate about how much stiffer the clay might be without further borings or strength analysis predictions.

The concept that the sand pile was responsible for the stiff clay was first suggested in Braun's 15 November 2002 report of its geotechnical investigation. The report contained a soil strength prediction based upon an analysis performed using the NAVFAC/Skempton formula which led Mr. Baker to believe that the difference between the samples taken by Braun and Terracon and the three contract borings logs was due to the sand overburden. After consultation with Mr. Crum, he concluded that Bay West should have anticipated the conditions encountered.

We are convinced, however, that a reasonably competent dredger would not likely know about the NAVFAC/Skempton and/or Mesri formulas for predicting soil strength, much less have the geotechnical expertise to use them. Dredging contractors are not held to the knowledge that geotechnical experts such as Braun or Mr. Crum might derive from the contract documents and a site investigation. *See Stock & Grove, supra,* 493 F.2d at 637. They also are not expected to hire an expert to undertake any independent pre-bid geotechnical investigations, such as performing soil strength predictions or taking their own borings. *See Foster Construction C. A. and Williams Brothers Co. v. United States,* 435 F.2d 873, 888-89 (Ct. Cl. 1970); *Giuliani Associates, Inc.*, ASBCA Nos. 51672, 52538, 03-2 BCA ¶ 32,368 at 160,165, *aff'd,* 111 Fed. Appx. 606 (Fed. Cir. 2004); *Praught Construction Corp.*, ASBCA No. 39670, 93-2 BCA ¶ 25,896 at 128,820, *aff'd on recons.*, 93-3 BCA ¶ 26,084.

In this regard, we further note that, despite his trial testimony, even Mr. Crum did not perform a predicted strength analysis when he prepared the Corps' estimate for the dredging work. Moreover, the fact that the Corps' estimate is so much lower than that of both Bay West and Matteson strongly suggests that he also did not take into consideration the possibility of any surcharge consolidation from the sand pile.

On the basis of the foregoing, we conclude that a reasonably competent dredger would not have foreseen that the clay under the temporary dredged sand pile would be stiff clay simply because it had been subjected to a surcharge.

Reliance

Bay West contends that Mr. Maturin properly considered the boring logs to be the best information about the subsurface conditions available and reasonably interpreted them as indicating that the native soils on McMillan Island would be "basically soft clay" when preparing Bay West's bid. The Corps concedes that the logs indicated that the clay in the borings was "v. soft to soft" (gov't br. at 112). It contends, however, that Bay West did not act as a reasonably prudent contractor when relying upon the logs because Mr. Maturin did not consider the surcharge and also because he disregarded the reference to medium stiff clay in Note 2.

It has long been the rule that contract borings are the most significant indicator of subsurface conditions. The work site here was located within the reasonable bounds of where the borings had been taken and Bay West was entitled to rely upon the three logs for the information reasonably conveyed about expected subsurface conditions at McMillan Island. This is so even though the contract advised bidders they were responsible for making their own determination of the characteristics of the native soils and contained disclaimers in the Physical Data clause. *See Foster Construction*, *supra*, 435 F.2d at 888; *C&L Construction Co.*, ASBCA Nos. 22993, 23040, 81-1 BCA ¶ 14,943 at 73,962, *aff'd on recons.*, 81-2 BCA ¶ 15,373. *See also Weeks Dredging & Contracting, Inc. v. United States*, 13 Cl. Ct. 193, 220 (1987), *aff'd*, 861 F.2d 728 (Fed. Cir. 1988).

Having resolved the surcharge issue in favor of Bay West in the context of the foreseeability requirement, we are not persuaded that *McCormick Construction Co. v. United States*, 18 Cl. Ct. 259 (1989), *aff'd*, 907 F.2d 159 (Fed. Cir. 1990), cited by the Corps, is applicable. In that case a drilling contractor alleged that the boring logs did not indicate the presence of boulders in quantities that would cause difficulty drilling. The court concluded that, even if the contractor had reasonably interpreted the logs, the contractor's reliance upon its interpretation was unreasonable in the face of contradictory evidence from its site investigation that it would be drilling in an alluvial fan with exposed boulders. 18 Cl. Ct. at 263-65.

In contrast, the evidence here established that it was not possible to determine how much stiffer the clay might be as the result of consolidation from the sand pile surcharge without further geologic investigation. In such circumstances, we do not expect a reasonably prudent bidder to assume a worse case than that reflected by the contract indications and then speculate about how much different the subsurface conditions might be. Indeed, to require contractors to make such assumptions and speculate about the subsurface conditions would reintroduce the gamble of windfalls and disasters and force contractors to revert to the practice of increasing their bids. *See Foster Construction*, *supra*, 435 F.2d at 887-88.

Turning next to Note 2 to the boring logs, the Corp does not contend that there is any conflict between the logs and the note, and when we give meaning to the contract as a whole and interpret it so as to avoid a conflict or render any of the provisions meaningless, we are satisfied that the reference to medium stiff clay in Note 2 provided additional information to bidders. *See Lockheed Martin IR Imaging Systems, Inc. v. West*, 108 F.3d 319, 322 (Fed. Cir. 1997); *Lamb Engineering & Construction Co.*, ASBCA Nos. 53304 *et al.*, 06-1 BCA ¶ 33,178 at 164,425 (drawings and notes must be harmonized and read together).

Mr. Gren thought that other dredgers, like Mr. Maturin, would disregard the reference to medium stiff clay in Note 2 because it was not factually supported by the boring logs, but conceded that a contractor could have asked about the reference to avoid making an incorrect assumption. Mr. Jorgenson could not explain why Note 2 contained the reference to medium stiff clay, but no reference to very soft clay, and we decline to speculate about what the Corps' response might have been if Bay West had inquired. Dr. Fowler, a geotechnical engineer, also thought a dredger would disregard the note. None of the expert dredgers called to testify by the Corps addressed Note 2. In the face of the legal standards applicable to matters of contract interpretation such as this, we consider the evidence insufficient to conclude that it was reasonable for Mr. Maturin to disregard the reference to medium stiff clay in Note 2 and rely solely upon the boring logs. *See Lockheed Martin IR Imaging Systems, supra; Performance Construction, Inc.*, ASBCA No. 53575, 05-2 BCA ¶ 33,027 at 163,676-77 (contactor's interpretation that ignored drawing notes found unreasonable).

This is not the end of our inquiry, however, because Bay West's differing site condition claim is based upon stiff clay, not medium stiff clay. The contract documents did not indicate the presence of stiff clay below elevation 612 and we concluded that a reasonably prudent dredger in the circumstances presented here would not have speculated about how stiff the clay under the sand pile might be when preparing its bid. Bay West's interpretation of the contract documents in this regard and its reliance upon that interpretation were reasonable.

Resultant Injury

Bay West computed the impact of dredging stiff clay using a measured mile approach that is based upon a production rate of 246.8 cubic yards per hour for the stock pile period it believes most closely approximates its original estimates and performance plan. The method was verified by DCAA. The measured mile approach provides a comparison of a production period that is impacted by a disruption with a production period that is not impacted. *See DANAC, Inc.*, ASBCA No. 33394, 97-2 BCA ¶ 29,184 at 145,152, *aff'd on recons.*, 98-1 BCA ¶ 29,454. We have accepted the methodology in

other cases. *See, e.g.*, *Perini Corp.*, ASBCA No. 51573, 04-1 BCA ¶ 32,630 at 161,447, *granting recons. in part*, 04-1 BCA ¶ 32,530 (methodology used to correct formula upon which the number of delay days was based in earlier decision) and *W.G. Yates & Sons Construction Co.*, ASBCA Nos. 49398, 49399, 01-2 BCA ¶ 31,428 at 155,210-11 (methodology used to compute incurred costs of labor inefficiency).

While the Corps did not dispute the measured mile methodology Bay West used to measure the impact of stiff clay on its dredging productivity, the Corps did dispute a number of the methodology's underlying aspects. It first challenged the measured mile production rate used by Bay West due to alleged mathematical errors. This dispute appears to have arisen from confusion about whether the stock pile period begins on 7 or 8 November 2002, an issue we cannot resolve on this record, but one we believe ultimately relates to quantum. For purposes of showing entitlement based upon the fact of injury, however, we found the record sufficient to establish that Bay West achieved a measured mile production rate that ranged between 219.4 or 221.2 (computed by the Corps) and 246.8 cubic yards of material per hour (computed by Bay West).

The next dispute raised by the Corps relates to the mathematical computation of the number of cubic yards dredged during the first, or water cannon, performance period, 24 August through 14 October 2002, and is also a quantum issue. As to entitlement, we found the record sufficient to establish that the average production rate ranged between 96.7 and 100.7 cubic yards per hour. Depending upon the measured mile production rate used, the range of the number of additional dredging hours is between 268.93 or 271.45 (computed by the Corps) and 395.9 (computed by Bay West).

The Corps also contends that, from 3 to 14 October 2002, Bay West experienced an increase in productivity to 115.5375 cubic yards per hour that can only be attributed to learning curve efficiencies. We cannot agree with this contention for several reasons. First, the Corps provides no credible explanation or basis for its assumption that Bay West's learning curve continued to 3 October 2002. Next, the 115.5375 cubic yard production rate is virtually identical to the 115.5382 cubic yard production rate it computed for the period 16 September to 3 October 2002. That being so, it seems to us that the learning curve ended not later than 15 September 2002. This is consistent with the evidence relating to the length of a normal learning curve for a new dredging project and the production rate of 85.39 cubic yards the Corps computed for the period 24 August to 16 September 2002. We declined to adopt Mr. Kulberg's view that the learning curve ended 5 September 2002 and now conclude that it ended not later than 15 September 2002.

The Corps further contends that the number of additional dredging hours computed as being attributable to the impact of stiff clay is significantly overstated because the measured mile was based upon the stockpile period which did not include

any adjustment for the impact that clay, even soft clay, would have had on the production rate. It also seems to question whether the water cannon method is as efficient as the bulldozer method. The measured mile production rate Bay West computed for the stockpile period is reasonably comparable to the published chart production rates it used when preparing its bid, which did include an adjustment for a small amount of soft clay. Both rates use the water cannon method. Whether using a bulldozer would have been more efficient method is a matter of conjecture. Nevertheless, given our finding that the contract documents indicated that the material below elevation 612 would consist of saturated, organic silty clay, the density of which would be very soft and soft to medium stiff, we agree with the Corps that an adjustment to the measured mile calculation for dredging such clay is necessary.

The Corps' final arguments relate to the equipment selected by Bay West, its planned method of operation, and the amount of downtime it experienced due to equipment maintenance and repair. We found nothing inappropriate about Bay West's selection of the Ellicot 370 dredge or its plan to undercut the island with the dredge cutter head and use water cannons to feed sand from the sand pile. Nor does the evidence support the Corps' contention that downtime for maintenance and repairs was the cause or predominate cause of the need to return to the work site in the spring of 2003. Attachment 1 to the Corps' post-hearing brief is not part of the evidentiary hearing record. In any event, there was no evidence, such as industry averages, against which to compare Bay West's maintenance and repair experience.

We conclude that Bay West has demonstrated that it was damaged as the result of the stiff clay it encountered during its dredging operations. Correction of any mathematical errors, together with appropriate adjustments for learning curve inefficiencies and dredging clay indicated by the contract documents, are matters to be addressed in connection with the quantum determination.

Modification No. P00010

The Corps argues that Bay West is barred by bilateral Modification No. P00010 from recovering costs associated with placing dredge material at the Buck Creek site to elevation 640. It has the burden of proving its accord and satisfaction defense and must show mutual agreement between the parties with the intention clearly stated and known to both Bay West and the Corps. *See Collazo Contractors, Inc.*, ASBCA No. 53925, 05-2 BCA ¶ 33,035 at 163,747, *recons. denied*, 06-1 BCA ¶ 33,212, *aff'd mem.*, No. 2006-1444 (Fed. Cir. 27 Mar. 2007). Proof establishing mutual agreement or "meeting of the minds" of the parties is a critical prerequisite to finding the costs claimed are barred. *See Brock & Blevins Co. v. United States*, 343 F.2d 951, 955 (Ct. Cl. 1965).

The Corps did not meet its burden of showing mutual agreement. The main purpose of Modification No. P00010 was to extend the interim completion date to 20 December 2002. Ms. Gulan negotiated the modification on behalf of the Corps and thought that it stood on its own. Mr. Wangensteen, however, did not believe he was waiving any right to recover costs associated with moving the material to elevation 640 if Bay West prevailed upon its pending differing site condition claim because he thought that Bay West would have met the interim completion date and would not have been performing the changed work if it had not encountered the stiff clay. Thus, that aspect of the stiff clay differing site condition claim that seeks $134,586.00 for this work is not barred by accord and satisfaction.

CONCLUSION

We conclude that Bay West carried its burden of demonstrating that it encountered both debris and stiff clay differing site conditions. We sustain ASBCA No. 54166 to the extent indicated above and return the matter to the parties to negotiate a reasonable quantum settlement that reflects our findings and conclusions.

Dated: 25 April 2007

CAROL N. PARK-CONROY
Administrative Judge
Armed Services Board
of Contract Appeals

I concur

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

I concur

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

I certify that the foregoing is a true copy of the Opinion and Decision of the Armed Services Board of Contract Appeals in ASBCA No. 54166, Appeal of Bay West, Inc., rendered in conformance with the Board's Charter.

Dated:

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