

## Responses to Review Panel Comments for Costs

The panel was asked to review the Corps' cost estimate for the Columbia River Channel Improvement Project. The review did not involve a line-by-line review of the cost estimate; rather, the panel set up a preliminary review and a secondary detailed review of items of concern. The cost panel had no outstanding disagreements or open questions upon the completion of the review.

Generally, the panel concluded that assumptions contained in the Corps' cost estimate were reasonable and complete. Responses to the panel's specific comments are included below.

**1. Panel Comment.** *Channel Design* The typical over depth for new work dredging would be the same as recent maintenance dredging. Dredging should be accomplished with an average over depth of one foot in sandy river bed reaches, an additional foot should be added to the required depth to accommodate future maintenance dredging.

**Corps Response.** We agree, the existing maintenance program requires 44 feet for the project and pays to 45 feet. To make the channel improvement consistent with the maintenance program we are modifying the dredging prism. For the purposes of this document the Corps' assumptions on dredging depths are the following: in sandy reaches, required depth of 47 feet with paid over depth dredging to 48 feet for the contract; in basalt rock required to 48 feet, paid overdepth to 49 feet and nonpaid overdig to 50 feet. The construction bid documents in basalt will reflect one foot of paid over-depth dredging and allowances for one foot of non-pay over-depth due to equipment limitations in basalt removal. The Corps does not agree that allowing for 1 foot of paid over-depth will result in contractors dredging to maximize paid. The contract will be paid based on pre and post surveys of the channel. Due to the dredge equipment's inability to remove subsurface material to an absolute neat line, the contractor's interest in maximizing payment will be balanced by the interest to minimize non-pay over dredging. Our experience with maintenance dredging has indicated that this approach may be, depending upon the individual circumstances of the contract, less expensive than repeated post surveys and re-dredging areas to meet minimum requirements should a contractor attempt to minimize unpaid over dredging.

The original assumption in pipeline dredging included an additional one-half foot of non-pay over dig. This item has been eliminated from the cost estimate as a result of the panel's input.

**2. Panel Comment.** *Production Rates for All Dredge Types.* The dredge cuts will behave more as maintenance dredging cuts. The loose, mixed nature of the silty sand sediment will allow the dredge material to flow to the dredge and not behave as the more dense, consolidated material characteristic of new work virgin cuts. Because new work dredging will behave like maintenance dredging, the Corps 5% increases in dredge time for new work is too conservative and is not reasonable.

In channel areas where the advance rate of the dredge will control cutterhead production (i.e., where 67% of channel includes dredge faces less than four ft.), the Corps' estimates is too conservative. Production rates for larger cuts, greater than 10 ft., appear to be reasonable while rates for dredging intermediate faces, four to 10 ft., would require further analysis to determine if advance rate or dredge pump rate control production.

**Corps Response.** The Corps will calculate the productions rates on cuts of 4 ft or less as the technical panel has recommended. However, the 5% additional time for cleanup will not be removed since past dredging contracts required the contractor to return to dredge additional material.

**Team Comments: 5% additional time for clean up is confusing and we continue to believe unnecessary. Since, you have a history of dredging, and a production rate to complete that dredging, why not use that as the basis for your estimate instead of an additional time factor. You have the production rate for maintenance dredging totally identified by past experience. Further if the dredger does have to go back (which if it is typical for the dredging, should be included in your average production rate data base), there will be no additional cost to the Government.... the contractor is paid by the unit volume dredged, which is a bid item. The pre and post dredge survey method would not measure payment twice. The time to go back should be built into your dredge production history. There should not be any added cost for 5% additional time as the contractor is dredging the same unit he bid, based on pre and post dredge surveys. Now if you are saying that the volume calculated from the predredge is revised by an interim predredge during construction, and that volume is typically an increase of 5% of total volume that was bid, we have a different situation.**

**3. Panel Comment. *Cost Adjustment Factors.*** The panel noted that the narrative section of the cost estimate identifies four topic areas where the panel concluded cost adjustment factors were inappropriately applied: over-depth quantities, quantities along the channel slope, cleanup factor and hopper dredge. Each topic area is addressed separately in the text below.

**Panel Comment. *Over-depth Quantities:*** the dredging contract should identify depth of dredging required for the project. An over-depth of one (1) ft. should be used for hydraulic pipeline and mechanical dredge, but should not be identified as a pay item.

**Corps Response.** Please see response to Number 1 above.

**Panel Comment. *Quantities Along Channel Slope (Sand):*** allowance for slope sloughing as a percentage of the dredging volume is too conservative, and is not reasonable.

**Corps Response.** Quantities Along Channel Slope: were included in the quantity calculations by assuming a slope of 1 on 3. This slope is based on extensive experience with maintenance dredging in the Columbia River and has proven to be a reasonable

surrogate for the inherent unknowns in estimating the quantities. Though this approach may be conservative, we feel it is appropriate for planning phase of the project.

**Panel Comment to Reponse:** . We agree with the 1 on 3 slope assumption. The volume of dredging for contract bid (and payment) should be estimated from a predredge with a 1 on 3 slope included. We believe that is what your response says. The slope material will not be dredged unless it sloughs into the navigation channel between the toes of the dredge cut. We understood that the total volume of dredging in the bid includes all of the material within that 1 on 3 side slope. The thicker the cut face, the more volume in the slope.

The contractor gets paid the difference between pre and post dredge. Using a straight percentage of slope volume based on the total volume to be dredged within the dredgecut (toe to toe), instead of estimating slope volume by depth of cut face, can result in an excessive volume calculation to what actually will be dredged and paid on a unit cost basis. This leads to a greater cost estimate. The panel continues to recommend that a percentage factor not be used in addition to or instead of calculating the volume.

**Panel Comment.** *Cleanup Factor:* this is negligible for shallow cuts or for clamshell operation in the rock areas where dredging is not typically “new work,” and is more like maintenance dredging. For deep bank cuts (greater than eight-ten ft.), a consideration for clean up cost may be appropriate, but should be based on engineering analysis using geotechnical characteristics of slope failure and length of applicable reach, with a different value for different cut heights.

**Corps Response.** The 5% cleanup factor in pipeline dredging for cuts of 4 ft or less has been removed. For higher cuts, past dredging contracts administered by the district required directing the contractor to go back and perform dredging operations. Again, this approach may be conservative; however, we believe it is appropriate for the planning phase of the project.

**Panel Comment to Response:** We do not disagree with concept of going back to dredge material that was not dredged from within the dredge prism, or that sloughed after dredging. This cost, however should already be identified in bid, and in predredge volumes. Contractor bid to complete dredging to the required depth, with payment on a unit price basis. Cost should not change. Do you add another 5% to cost of dredging, or just to time of dredging?

**Panel Comment.** *Hopper Dredging:* a five percent (5%) increase in time is assumed for “new work” by the hopper dredges, but the project is virtually a maintenance dredging effort. Existing cost for maintenance dredging is an excellent basis for the hopper dredge cost estimate, without any time increase.

**Corps Response.** The Corps agrees that the material will be similar in nature to maintenance dredging; characterizations of the material have been modified to reflect the

panel's comments. The West Coast Team included the 5% increase in time as a cost item based on experience with maintenance dredging. The panel maintains existing costs for maintenance dredging is an excellent basis for the hopper dredge estimate. We agree, the 5% cost item is routinely included in maintenance dredging cost estimates completed at this level. Consequently, the 5% increase in time will not be removed from the hopper dredging.

**Panel Comment to Reponse: This is confusing. When you have a production rate based on years of Hopper Dredge history, why are you not using these values? Why add 5% to a long term data base? The contract is bid on a predredge survey volume. The contractor can not dredge more than is identified in the predredge survey volume to the maximum pay depth. Yet you add another 5% increase in cost. Is this for infill during the dredging operation? Is this just time, but not cost?**