UNDERTAKING JT1.11

Undertaking

ANSWER THE STAFF INTERROGATORIES.

Ref:

OEB staff notes that in part (b) to Staff-174, Bates White stated that its position is that the EMWG nuclear unit hours and non-nuclear units hours reflect none of the site-specific considerations that Bates White described in its report. In part (c) to Staff-174, Bates White noted that the unit installation rates provided in the EMWG are based on actual construction times for the construction of nuclear reactors in the US.

a) Please confirm that the unit hours listed at p. 161 of the EMWG Guidelines are those that are reflected in the Bates White study.

Starting at p. 167 of the EMWG Guidelines, a list of the reference plants is provided. The noted reference plants appear to be the basis for the unit hours provided at p. 161 of the EMWG Guidelines.

b) Please advise whether Bates White agrees that the reference plants cited above are the basis for unit hours in the EMWG Guidelines.

i. If not, please explain.

ii. If Bates White does agree, would Bates White also agree that the actual construction times associated with these reference projects would implicitly reflect any actual site-specific considerations that impacted these projects (i.e. EMWG did not make after the fact adjustments to remove site-specific considerations from the reference projects in developing the unit hours)?

At Chart 2 provided in response to Staff-172, Bates White highlights that removing the entirety of the incremental productivity adjustment reduces the direct construction costs from $307.7 million to $288.7 million.

c) Please advise whether this $19 million reduction was determined by revising the calculations in Appendix D to the Bates White study to remove the 1.7 productivity factor. As an example, at p. 72 of Exhibit D2 / Tab 2 / Schedule 11 / Attachment 3, Bates White would have removed the 1.7 productivity factor but maintained the wage adjustment that forms part of the overall productivity adjustment of $1.18 million for the reinforced concrete partition wall.

Response

This was response was prepared by Bates White.

a) Partially confirmed. The data in Table G.1.3 (referenced in the question) are more correctly described as "unit hour installation rates" for a given unit of a commodity (e.g., linear meter of pipe, cubic meter of concrete) and not "unit hours" as that phrase is typically understood. These unit hour installation rates were an input to the "Adjustments to Labour Costs to Account for Nuclear Grade Work" discussed in Appendix C of the Bates White report.

b) Not agreed. The tables referenced in the question (starting at p. 167 of the EMWG Guidelines) present information regarding the percentage of hours and cost attributable to direct installation of eight categories of commodities: mechanical systems, concrete, structural steel, other civil structural, piping, instrumentation, electrical, and "other direct." This information might be useful in a top-down cost estimate; however, as summarized in Section V.B of our report, Bates White employed a bottom-up estimation approach.

   The information in the referenced tables did form part of the basis for the corroborating analysis discussed in Section VII.A of the Bates White report. Such use is consistent with the EMWG stated intent that the "data may be useful as a validation tool…" (see introduction to the tables, p. 167).

   For clarity, we note that the data provided in Tables G.1.3 (p. 161) and G.2.1-G.2.6 (pp. 167-170) are "bulk commodity unit installation rates" and information regarding the percentage of hours and cost attributable to direct installation of the eight categories of commodities—they are not "times." There is no direct tie between such installation-specific information and "actual construction times" for the reference projects. The source document for these installation rates states that the rates "were obtained from actual architect/engineer cost experience" (see Oak Ridge National Laboratory, "Cost Estimating Guidelines for Advanced Power Technologies," ORNL/TM-10071, May 1993). The EMWG requires that use of these installation rates, regardless of whether in a top-down or bottom-up cost estimate, be supplemented by separately calculated productivity estimates and local labour rate information (see EMWG Sections 5.3.2 and 6.5).

c) No, Bates White did not revise all the calculations in Appendix D; instead we modified a single input, the labour productivity rate, in response to Staff's requested hypothetical.

   Bates White prepared Chart 2 in response to the question in Ex. L-D2-02-Staff-172. The chart depicts the data generated to produce the requested sensitivity

plot depicting the hypothetical impact of 1% changes in the productivity rate Bates White used in developing its direct construction cost estimate of $307.7 million. The Bates White construction cost estimate is based on a labor productivity rate of approximately 0.39. The upper bound rate in the sensitivity analysis requested by Ex. L-D2-02-Staff-172 was 0.66, i.e., the productivity rate underlying the cost data in the RSMeans database. At a productivity rate of 0.66, the implied direct cost of construction is $288.7 million, some $19 million lower than the Bates White estimate.

The implied difference of $19 million in direct construction costs was not, therefore, determined by removing a 1.7 productivity factor. Rather, the implied difference resulted from the requested, hypothetical marginal increases of 1% in labor productivity from the Bates White estimate of approximately 0.39 to the RSMeans productivity rate of 0.66. The ratio of the RSMeans productivity rate to the Bates White productivity rate is 1.7 (≈0.66/0.39). Thus, at the upper bound of the Bates White sensitivity analysis, using a hypothetical rate of 0.66, the productivity ratio is 1.0 (≈0.66/0.66).

As noted in our response to Ex. L-D2-02-Staff-172, given the realities of a nuclear industrial construction project, realization of the hypothetical difference of $19 million in direct construction costs over the life of the D2O project is implausible.

Further, the sensitivity analysis provided in response to Ex. L-D2-02-Staff-172 examined only hypothetical marginal changes in the labor productivity rate. The $1.8 million referenced in this question would also reflect an adjustment for the difference in wages between contractor labor costs and RSMeans labor costs. Bates White did not adjust these wage differentials. Thus, as the current question suggests, the Bates White labor wage adjustment portion of the overall labor adjustment factor (based on site-specific data described in Appendix C)—as reflected (for example) in the $1.8 million cost for the reinforced concrete partition wall—remained unchanged in the sensitivity analysis.