DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

(PENNSYLVANIA, NEW JERSEY, AND DELAWARE)

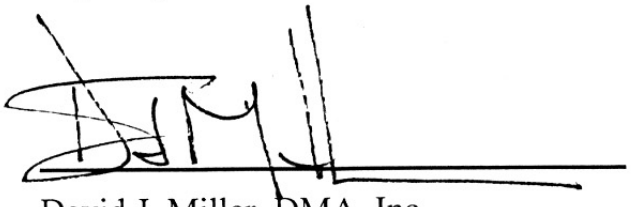
Economic Benefits Internal Review Report

Prepared by:
David Miller & Associates, Inc

December, 2002

SUPPLEMENTAL STATEMENT OF CERTIFICATION

This certification is hereby supplemented to confirm that changes made subsequent to the September 24, 2002 draft report have been reviewed and are certified to be accurate and consistent with applicable regulations and guidance. (Please note that no changes were made in the Associated Cost Analysis or DRI-WEFA Commodity Projections and Fleet Forecast Report requiring recertification).

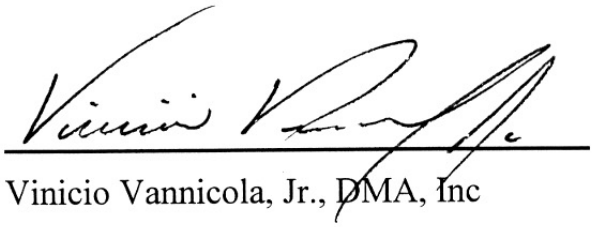


December 6, 2002

David J. Miller, DMA, Inc.

Date

QC Manager



December 6, 2002

Vinicio Vannicola, Jr., DMA, Inc

Date

Benefit Analysis and Report ITR

Introduction

Analytical model changes and report revisions were made in response to comments received from HQUSACE and the External Independent Technical Review (EITR) team subsequent to the completion of the September 24, 2002 Draft Report. These changes have been included in the December 2002 version of the Delaware River Main Channel Deepening Project (Pennsylvania, New Jersey, And Delaware) Comprehensive Economic Reanalysis Report and in supplemental model documentation that has been provided to CENAP, CENAD, and HQUSACE in electronic format on an accompanying CD-ROM.

The EITR comments, Philadelphia District responses, and HQUSACE assessment are documented in a separate report on file at HQUSACE. Appendix A – Costs was prepared by the Philadelphia District (CENAP) and Quality Control (QC) documentation has been prepared by them and provided in a separate CENAP QC Report. Appendix B – Real Estate was prepared by the Baltimore District (CENAB). No changes were made to Appendix B since the September 24, 2002 report; therefore QC documentation provided by CENAB in an earlier CENAB QC Report has not been supplemented. The lightering fleet vessel operating costs (VOCs) used in the benefit analysis were prepared by WRSC-IWR; therefore quality control of the VOC calculations has been performed by IWR.

The purpose of this QC Report is to document the changes made in the analytical models, the main report, and Appendix C – Benefits Analysis in response to EITR and HQUSACE comments, and to document the QC process employed to check and verify the changes. Documentation of earlier phases of the QC process has been provided in previous QC Reports and is not included in this document.

There are three portions to this QC Report. The first describes the modifications made to the analytical models and how those modifications have been checked for accuracy and completeness. The second contains a checklist used to verify the model modifications. The third contains a checklist used to verify that the appropriate changes were made to the Main Report and Appendix C – Benefit Analysis.

MODEL MODIFICATIONS

Original Models Dated July 31, 2002
New Models Dated November 22, 2002

Model: Container Vessels

Page: Container Inputs

In response to concerns expressed by the external review team, the model was modified to include simultaneous cost calculations for the with- and without-project conditions. The earlier version of the model included a field (cell C4) for Maximum Channel Depth, into which the user would type either 40 or 45 (for the without- and with-project conditions, respectively). This field was eliminated, and all cells that referred to that field have been modified accordingly.

The Vessel Operating Costs (cells C41-C42) have been updated to reflect 2002 levels.

The Vessel Operating Costs (cells C41-C42) are no longer fixed values. They now reference an external file that shows the derivation of the constant and factor from the original Vessel Operating Cost data provided by IWR.

The current version of the model only calculates costs for one carrier (P&O Nedlloyd). All references in the earlier version of the model to Allianza (sic), Samer and Columbus Lines have been eliminated. In the earlier version of the model, the analysis of these carriers yielded zero benefits, so there was no reason to leave these carriers in the model.

Page: Benefits

This is a new page that was added to the model when it was modified to include simultaneous cost calculations for the with- and without-project conditions. On this page, the present values of annual costs for each condition are summed up, and the annualized costs and benefits are calculated, using the current discount rate.

The formulas in row 6 reference the without-project costs in row 18 of the "Container Costs – without" page.

The formulas in row 19 reference the without-project costs in row 18 of the "Container Costs – with" page.

Page: Container Costs – Without

This page uses the same formulas and logic as the page named "Container Costs" in the earlier version of the model.

All references to Allianza, Samer and Columbus have been eliminated (see earlier note).

In the earlier version of the model, the calculation of vessel costs changed, depending on the position of the with-/without-project toggle on the Container Inputs page (cell C4). Now, the at-sea distance used to calculate the Cost per Vessel references only one field: cell D7 on the "Mileage Check" page.

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Container Costs – With

This page uses the same formulas and logic as the page named "Container Costs" in the earlier version of the model.

All references to Allianza, Samer and Columbus have been eliminated (see earlier note).

In the earlier version of the model, the calculation of vessel costs changed, depending on the position of the with-/without-project toggle on the Container Inputs page (cell C4). Now, the at-sea distance used to calculate the Cost per Vessel references only one field: cell H7 on the "Mileage Check" page.

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Annual TEU Volumes

All references to Allianza, Samer and Columbus have been eliminated (see earlier note).

The number of vessels required by the P&O Nedlloyd fleet (row 10) cannot equal less than 52 calls per year, based on communications with carrier personnel.

Page: Mileage Check

All references to Allianza, Samer and Columbus have been eliminated (see earlier note).

Model: Bulkers

Page: Inputs

In response to concerns expressed by the external review team, the model was modified to include simultaneous cost calculations for the with- and without-project conditions. The earlier version of the model included a field (cell B22) for Maximum Draft in Channel, into which the user would type either 40 or 45 (for the without- and with-project conditions, respectively). This field was eliminated, and all cells that referred to that field have been modified accordingly.

In the earlier model, the value in cell B21 was calculated based on the value in cell B22. This value represented the maximum draft at which a vessel could travel at high speed up the channel. With the elimination of the with-/without-project toggle, this calculation is handled in another part of the worksheet.

The growth rates in cells B5-G5 were modified, to more accurately reflect the mix of commodities carried on bulker vessels.

The Vessel Operating Costs (cells B9-C10) have been updated to reflect 2002 levels.

The Vessel Operating Costs (cells B9-C10) are no longer fixed values. They now reference an external file that shows the derivation of the constants and factors for at-sea and at-port costs from the original Vessel Operating Cost data provided by IWR.

The factors used in the Tons Per Inch calculation (cells B21-B23) have been updated to reflect 2002 levels.

The deadweight tonnage (cell B28) for a representative Slabs vessel (to be added as import levels grow) was modified, to more accurately reflect the characteristics of the fleet.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in rows 6 and 7 reference the without-project costs in rows 7 and 13 on the Cost Summary page.

The with-project costs in rows 25 and 26 reference the with-project costs in rows 29 and 35 on the Cost Summary page.

The summary of the present value of without-project costs in cells C44 and D44 reference the without-project costs in rows 13 and 14.

The summary of the present value of with-project costs in cells G44 and H44 reference the without-project costs in rows 32 and 33.

The benefits calculated in rows 49 and 50 reference the costs calculated in cells C44-E45 (without-project) and cells G44-I45 (with-project).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Port (rows 4 and 10) reference the "Cost Port – WO" page.

The without-project Costs in Channel (rows 5 and 11) reference the "Cost Channel – WO" page.

The without-project Costs at Sea (rows 6 and 12) reference the "Total Costs – WO" page.

The with-project Costs at Port (rows 26and 32) reference the "Cost Port – WITH" page.

The with-project Costs in Channel (rows 27 and 33) reference the "Cost Channel – WITH" page.

The with-project Costs at Sea (rows 28 and 34) reference the "Total Costs – WITH" page.

Page: Bulker Database

In the earlier version of the model, the fleet was listed in the following order: existing slag vessels, existing slabs vessels, additional (representative) slag vessels, and additional (representative) slabs vessels. Now, the slag vessels have been grouped together, as have the slabs vessels. This change was purely cosmetic, but makes it easier to follow the logic of the model.

In the earlier version of the model, the Max Tons per vessel (column W) would change, depending on the position of the with-/without-project toggle. Now, the value is fixed for the without-project condition.

Column W calculates the Maximum Tons carried by each vessel, using a channel depth of 40 feet (without-project condition). Slag vessels are allowed to arrive with a 40 ft draft; however, the draft for slabs vessels cannot exceed 39 feet (based on actual historic performance).

Page: Actual Comm Growth – WO

The changes to this page are purely cosmetic.

The page was renamed (formerly Actual Comm Growth).

Two rows were placed between the slag and slabs vessels.

Page: Distrib Comm Gro – WO

The vessels on this page were rearranged in the same way as those on the Bulker Database page. All slag vessels are now grouped together, and are separated from the slabs vessels.

The formulas that determine how much tonnage to place on each vessel (cells E25-BB130) reference column W on the Bulker Database page, which is the Max Tons per vessel for the without-project condition.

Page: Draft Grow – WO

The vessels on this page were rearranged in the same way as those on the Bulker Database page. All slag vessels are now grouped together, and are separated from the slabs vessels.

No formulas were modified.

Page: Cost Channel – WO

The vessels on this page were rearranged in the same way as those on the Bulker Database page. All slag vessels are now grouped together, and are separated from the slabs vessels.

The formulas on this page previously referenced cell B21 on the Inputs page (the maximum speed at which a vessel can travel at high speed up the channel). Now the value that used to be in cell B21 under the without-project condition (37 feet) has been hardwired into the formulas.

Page: Cost Port – WO

The vessels on this page were rearranged in the same way as those on the Bulker Database page. All slag vessels are now grouped together, and are separated from the slabs vessels.

No formulas were modified.

Page: Total Costs – WO

The vessels on this page were rearranged in the same way as those on the Bulker Database page. All slag vessels are now grouped together, and are separated from the slabs vessels.

No formulas were modified.

Page: SLABS Overweight – WO

The first six rows on this page were deleted. They provided data for the slag vessels, and were not necessary for the calculations on this page.

Page: Rep Vessels – WITH

A different fleet was selected for the with-project condition, to more accurately reflect anticipated future conditions. One type of vessel will be used for the slag fleet. Two types of vessels will be used for the slabs fleet; however, one type will be used for 20% of the calls, while the other will be used for 80% of the calls.

The Max Tons calculation in column W was modified slightly. The new formulas ensure that slag vessels never arrive with a draft deeper than 45 feet (the depth of the channel in the with-project condition), and the slabs vessels never arrive with a draft deeper than their calculated 2001 sailing draft.

A new column was added (column X) for the Tons Per Inch calculation for each vessel. These figures were added to this page for ease of calculation.

Page: Distrib Comm Gro - WITH

In the earlier version of the model, there was one type of vessel used for slag, and one type of vessel used for slabs. Now, there are two different types of vessels used for slabs.

Page: Draft Grow – WITH

The Tons Per Inch value (column D) now references column X on the "Rep Vessels – WITH" page.

Page: Cost Channel – WITH

The formulas on this page previously referenced cell B21 on the Inputs page (the maximum speed at which a vessel can travel at high speed up the channel). Now the value that used to be in cell B21 under the with-project condition (42 feet) has been hardwired into the formulas.

Page: Cost Port – WITH

No formulas were modified.

Page: Total Costs – WITH

No formulas were modified.

Model: Delaware Terminal

Page: Inputs

In response to concerns expressed by the external review team, the model was modified to include simultaneous cost calculations for the with- and without-project conditions. The earlier version of the model included a field (cell B20) for Maximum Draft in Channel, into which the user would type either 40 or 45 (for the without- and with-project conditions, respectively). This field was eliminated, and all cells that referred to that field have been modified accordingly.

In the earlier model, the value in cell B16 was calculated based on the value in cell B20. This value represented the average time a vessel would spend waiting for acceptable tide conditions before traveling up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B16 and B17 represent the time spent waiting for the tide in the without- and with-project conditions.

In the earlier model, the value in cell B19 was calculated based on the value in cell B20. This value represented the maximum draft at which a vessel could travel at high speed up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B19 and B20 represent the maximum sailing draft allowed for a vessel to travel at high speed up the channel in the without- and with-project conditions.

The Vessel Operating Costs (cells B9-C10) have been updated to reflect 2002 levels.

The Vessel Operating Costs (cells B9-C10) are no longer fixed values. They now reference an external file that shows the derivation of the constants and factors for at-sea and at-port costs from the original Vessel Operating Cost data provided by IWR.

The factors used in the Tons Per Inch calculation (cells B24-B26) have been updated to reflect 2002 levels.

In the earlier version of the model, there was a value in cell B36 that represented an average barrel/ton conversion ratio. This value was not used in any calculations, since the model had already been modified to include country-specific conversion ratios, so that field has been deleted in the current version of the model.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in row 4 reference the without-project costs in row 7 on the Cost Summary page.

The with-project costs in row 12 reference the with-project costs in row 14 on the Cost Summary page.

The summary of the present value of without-project costs in cells D21 and D27 reference the without-project costs in row 8.

The summary of the present value of with-project costs in cells C21 and C27 reference the with-project costs in row 16.

The benefits calculated in cells E22 and E28 reference the costs calculated in cells C22-D22 (2008-2058) and cells C28-D28 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Port (row 4) reference the "Cost Port – WO" page.

The without-project Costs in Channel (row 5) reference the "Cost Channel – WO" page.

The without-project Costs at Sea (row 6) reference the "Total Costs – WO" page.

The with-project Costs at Port (row 11) reference the "Cost Port – WITH" page.

The with-project Costs in Channel (row 12) reference the "Cost Channel – WITH" page.

The with-project Costs at Sea (row 13) reference the "Total Costs – WITH" page.

Page: DelTerminal Database

In the earlier version of the model, the Max Tons per vessel (column W) would change, depending on the position of the with-/without-project toggle. Now, separate columns have been created for the with- and without-project conditions.

Column W shows the Max Tons per vessel in the without-project condition (where channel depth equals 40 ft).

Column X shows the Max Tons per vessel in the with-project condition (where channel depth equals 45 ft).

The barrels/ton values for each vessel have been moved from column X to column Y.

Page: Cost Channel – WO

The formulas on this page refer to two new cells: The maximum draft allowed for high speed travel up the channel in the without-project condition (cell B19 on the "Inputs" page), and the time spent waiting for the tide in the without-project condition (cell B16 on the "Inputs" page).

Page: Rep Vessels – WITH

In the earlier version of the model, the Maximum Tons for the vessels in the with-project condition (column W) referenced the values in column W of the "DelTerminal Database" page. These values would change, depending on the position of the with-/without-project toggle. Now, the values for the with-project condition are fixed, and have been moved to column X on the "DelTerminal Database" page.

So, the Max Tons values (column W) reference the "Max Tons at 45" column (column X) in the "DelTerminal Database" page.

Page: Cost Channel – WITH

The formulas on this page refer to two new cells: The maximum draft allowed for high speed travel up the channel in the with-project condition (cell B20 on the "Inputs" page), and the time spent waiting for the tide in the with-project condition (cell B17 on the "Inputs" page).

Model: Consolidated

Page: Global Inputs

In response to concerns expressed by the external review team, the model was modified to include simultaneous cost calculations for the with- and without-project conditions. The earlier version of the model included a field (cell B24) for Maximum Draft in Channel, into which the user would type either 40 or 45 (for the without- and with-project conditions, respectively). This field was eliminated, and all cells that referred to that field have been modified accordingly.

In the earlier model, the value in cell B23 was calculated based on the value in cell B24. This value represented the maximum draft at which a vessel could travel at high speed up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B23 and B24 represent the

maximum sailing draft allowed for a vessel to travel at high speed up the channel in the without- and with-project conditions.

The Vessel Operating Costs (cells B9-C10) have been updated to reflect 2002 levels.

The Vessel Operating Costs (cells B9-C10) are no longer fixed values. They now reference an external file that shows the derivation of the constants and factors for at-sea and at-port costs from the original Vessel Operating Cost data provided by IWR.

Three significant changes were made to the lightering cost (cells B12-C12 in the current model).

1. In the earlier model, the lightering cost represented an estimate of the price charged to the tankers by the lightering company. Now, the cost is an estimate of the actual operating cost for the lightering company. These costs are calculated in a separate worksheet named "Maritrans VOC", which is linked to this page.
2. In the earlier model, the lightering cost was expressed as a cost per ton. Now, it is expressed as a cost per barrel, and country-specific barrel/ton conversion ratios are applied elsewhere in the model.
3. In the earlier model, the lightering cost was the same in the with- and without-project conditions. Now, the lightering cost is different for each condition. Cell B12 provides the cost per barrel in the without-project condition, and cell C12 provides the cost per barrel in the with-project condition.

The factors used in the Tons Per Inch calculation (cells B30-B32) have been updated to reflect 2002 levels.

In the earlier model, the at-anchorage pumping rates shown in cells C41-C45 were calculated by taking a simple arithmetic average of the pumping rates for the three vessels used by the lightering company. Now, the pumping rates consist of weighted averages for the with- and without-project conditions.

The values in cells C43-C47 represent the weighted-average, at-anchorage pumping rate for the without-project condition. In this condition, it is assumed that all three lightering vessels are available to be used. The calculation of the weighted average is shown in cells F43-I46.

The values in cells D43-D47 represent the weighted-average, at-anchorage pumping rate for the with-project condition. In this condition, it is assumed that only two of three lightering vessels are available to be used. The calculation of the weighted average is shown in cells F49-I51.

In the earlier version of the model, there was information in rows 48-51 that pertained to the overweight percentage that might be allowed on a tanker. This value was not used in any calculations (due to previous modifications), so that information has been deleted in the current version of the model.

Page: Total Benefits

NOTE: This page replaces the page named "PV Costs" in the earlier version of the model.

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in row 5 reference the without-project costs in row 9 on the Costs page.

The with-project costs in row 13 reference the with-project costs in row 19 on the Costs page.

The summary of the present value of without-project costs in cells D24 and D29 reference the without-project costs in row 9.

The summary of the present value of with-project costs in cells E24 and E29 reference the with-project costs in row 17.

The benefits calculated in cells F25 and F30 reference the costs calculated in cells D25-E25 (2008-2058) and cells D30-E30 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Facility Benefits

This page was added to the model since the earlier version. It shows the benefits for each tanker facility, versus the combined benefits shown on the previous page.

The values in cells B8-C14 reference the "PV Calculation" pages in each of the individual tanker facility models.

Page: Costs

In the earlier version of the model, the costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time.

The values in rows 5 through 8 reference the without-project costs in the "Cost Summary" pages for each of the individual tanker facility models.

The values in rows 15 through 18 reference the with-project costs in the "Cost Summary" pages for each of the individual tanker facility models.

Page: Future Tonnage

In the earlier version of the model, the total tonnage and tons lightered figures on this page would change, depending on the position of the with-/without-project toggle. Now, the values for both conditions are shown at the same time.

The sum of lightered tonnage in the without-project condition (row 8) references the "Amount Lightered – Without" pages in each of the individual tanker facility models.

The sum of lightered tonnage in the with-project condition (row 22 references the "Amount Lightered – With" pages in each of the individual tanker facility models.

Model: Eagle Pt

Page: Inputs

See the comments for Model: Consolidated / Page: Global Inputs for a description of the majority of the changes made to this page.

In addition, the time spent waiting for the tide (cells B19-B20) has now been separated into values for the with- and without-project condition. In the earlier model, the value in cell B19 was calculated based on the position of the with-/without-project toggle. This value represented the average time a vessel would spend waiting for acceptable tide conditions before traveling up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B19 and B20 represent the time spent waiting for the tide in the without- and with-project conditions.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in row 5 reference the without-project costs in row 7 on the Cost Summary page.

The with-project costs in row 13 reference the with-project costs in row 16 on the Cost Summary page.

The summary of the present value of without-project costs in cells D22 and D28 reference the without-project costs in row 9.

The summary of the present value of with-project costs in cells E22 and E28 reference the with-project costs in row 17.

The benefits calculated in cells F23 and F29 reference the costs calculated in cells D23-E23 (2008-2058) and cells D29-E29 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Anchorage (row 3) reference the "Cost at Anchorage – without" page.

The without-project Costs at Port (row 4) reference the "Cost at Port – without" page.

The without-project Costs in Channel (row 5) reference the "Cost up Channel – without" page.

The without-project Costs at Sea (row 6) reference the "Total Costs – without" page.

The with-project Costs at Anchorage (row 12) reference the "Cost at Anchorage – with" page.

The with-project Costs at Port (row 13) reference the "Cost at Port – with" page.

The with-project Costs in Channel (row 14) reference the "Cost up Channel – with" page.

The with-project Costs at Sea (row 15) reference the "Total Costs – with" page.

Page: Tanker Database

Some of the 2000 tonnage values in column M were modified, because the Waterborne Commerce Statistics Center determined that there were errors in the database they had provided for this study. The values that have been modified are highlighted in green.

Page: Amount Lightered – without

In the earlier version of the model, the values in column E (lighter to) would change, based on the position of the with/without-project toggle. With the elimination of the toggle, these values are now fixed.

The values in column E are fixed at either 40 or 37 feet for the without-project condition.

Page: Amount Lightered – with

In the earlier version of the model, the values in column E (lighter to) would change, based on the position of the with/without-project toggle. With the elimination of the toggle, these values are now fixed.

The values in column E are fixed at either 45 or 42 feet for the with-project condition.

Page: Cost at Anchorage – without

The formulas in cells D2-BB94 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

The formulas in cells D2-BB94 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the without-project lightering cost per barrel (cell B12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB94 reference the pumping rates for the without-project condition (cells C41-C45 on the "Inputs" page).

Page: Cost at Anchorage – with

The formulas in cells D2-BB94 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

The formulas in cells D2-BB94 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the with-project lightering cost per barrel (cell C12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB94 reference the pumping rates for the with-project condition (cells D41-D45 on the "Inputs" page).

Page: Cost up Channel - Without

The formulas in cells D2-BB94 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

The formulas in cells D2-BB94 reference the time spent waiting for the tide in the without-project condition (cell B19 on the "Inputs" page).

The formulas in cells D2-BB94 reference the maximum draft for traveling at high speed up the channel in the without-project condition (cell B23 on the "Inputs" page).

Page: Cost up Channel - With

The formulas in cells D2-BB94 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

The formulas in cells D2-BB94 reference the time spent waiting for the tide in the with-project condition (cell B20 on the "Inputs" page).

The formulas in cells D2-BB94 reference the maximum draft for traveling at high speed up the channel in the with-project condition (cell B24 on the "Inputs" page).

Page: Cost at Port – Without

The formulas in cells E2-BC94 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

Page: Cost at Port – With

The formulas in cells E2-BC94 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

Page: Total Costs – Without

The formulas in cells D2-BB94 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - Without".

The formulas in cells D2-BB94 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - Without".

The formulas in cells D2-BB94 used to reference data on the page named "Cost at Port". Now, they reference data on the page named "Cost at Port - Without".

Page: Total Costs – With

The formulas in cells D2-BB94 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - With".

The formulas in cells D2-BB94 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - With".

The formulas in cells D2-BB94 used to reference data on the page named "Cost at Port". Now, they reference data on the page named "Cost at Port - With".

Model: Motiva

Page: Inputs

See the comments for Model: Consolidated / Page: Global Inputs for a description of the majority of the changes made to this page.

In addition, the time spent waiting for the tide (cells B19-B20) has now been separated into values for the with- and without-project condition. In the earlier model, the value in cell B19 was calculated based on the value in the with-/without-project toggle. This value represented the average time a vessel would spend waiting for acceptable tide conditions before traveling up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B19 and B20 represent the time spent waiting for the tide in the without- and with-project conditions.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in row 5 reference the without-project costs in row 7 on the Cost Summary page.

The with-project costs in row 13 reference the with-project costs in row 16 on the Cost Summary page.

The summary of the present value of without-project costs in cells D23 and D29 reference the without-project costs in row 9.

The summary of the present value of with-project costs in cells E23 and E29 reference the with-project costs in row 17.

The benefits calculated in cells F24 and F30 reference the costs calculated in cells D24-E24 (2008-2058) and cells D30-E30 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Anchorage (row 3) reference the "Cost at Anchorage – without" page.

The without-project Costs at Port (row 4) reference the "Cost at Port – without" page.

The without-project Costs in Channel (row 5) reference the "Cost up Channel – without" page.

The without-project Costs at Sea (row 6) reference the "Total Costs – without" page.

The with-project Costs at Anchorage (row 12) reference the "Cost at Anchorage – with" page.

The with-project Costs at Port (row 13) reference the "Cost at Port – with" page.

The with-project Costs in Channel (row 14) reference the "Cost up Channel – with" page.

The with-project Costs at Sea (row 15) reference the "Total Costs – with" page.

Page: Tanker Database

Some of the 2000 tonnage values in column M were modified, because the Waterborne Commerce Statistics Center determined that there were errors in the database they had provided for this study. The values that have been modified are highlighted in green.

Page: Cost at Anchorage – without

The formulas in cells D2-BB130 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the without-project lightering cost per barrel (cell B12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB130 reference the pumping rates for the without-project condition (cells C41-C45 on the "Inputs" page).

Page: Cost at Anchorage – with

The formulas in cells D2-BB130 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the with-project lightering cost per barrel (cell

C12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB130 reference the pumping rates for the with-project condition (cells D41-D45 on the "Inputs" page).

Page: Cost up Channel - Without

The formulas in cells D2-BB130 reference the time spent waiting for the tide in the without-project condition (cell B19 on the "Inputs" page).

The formulas in cells D2-BB130 reference the maximum draft for traveling at high speed up the channel in the without-project condition (cell B23 on the "Inputs" page).

Page: Cost up Channel - With

The formulas in cells D2-BB130 reference the time spent waiting for the tide in the with-project condition (cell B20 on the "Inputs" page).

The formulas in cells D2-BB130 reference the maximum draft for traveling at high speed up the channel in the with-project condition (cell B24 on the "Inputs" page).

Page: Total Costs – Without

The formulas in cells D2-BB130 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - Without".

The formulas in cells D2-BB130 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - Without".

Page: Total Costs – With

The formulas in cells D2-BB130 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - With".

The formulas in cells D2-BB130 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - With".

Model: Tosco

Page: Inputs

See the comments for Model: Consolidated / Page: Global Inputs for a description of the majority of the changes made to this page.

In addition, the time spent waiting for the tide (cells B19-B20) has now been separated into values for the with- and without-project condition. In the earlier model, the value in cell B19 was calculated based on the value in the with-/without-project toggle. This value represented the average time a vessel would spend waiting for acceptable tide conditions before traveling up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B19 and B20 represent the time spent waiting for the tide in the without- and with-project conditions.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in row 5 reference the without-project costs in row 7 on the Cost Summary page.

The with-project costs in row 13 reference the with-project costs in row 16 on the Cost Summary page.

The summary of the present value of without-project costs in cells D22 and D28 reference the without-project costs in row 9.

The summary of the present value of with-project costs in cells E22 and E28 reference the with-project costs in row 17.

The benefits calculated in cells F23 and F29 reference the costs calculated in cells D23-E23 (2008-2058) and cells D29-E29 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Anchorage (row 3) reference the "Cost at Anchorage – without" page.

The without-project Costs at Port (row 4) reference the "Cost at Port – without" page.

The without-project Costs in Channel (row 5) reference the "Cost up Channel – without" page.

The without-project Costs at Sea (row 6) reference the "Total Costs – without" page.

The with-project Costs at Anchorage (row 12) reference the "Cost at Anchorage – with" page.

The with-project Costs at Port (row 13) reference the "Cost at Port – with" page.

The with-project Costs in Channel (row 14) reference the "Cost up Channel – with" page.

The with-project Costs at Sea (row 15) reference the "Total Costs – with" page.

Page: Tanker Database

Some of the 2000 tonnage values in column M were modified, because the Waterborne Commerce Statistics Center determined that there were errors in the database they had provided for this study. The values that have been modified are highlighted in green.

Page: Distrib Comm Growth – without / Distrib Comm Growth - with

In the earlier version of the model, certain values on the "Distrib Comm Growth" page changed based on the position of the with-/without-project toggle. Now, those values are fixed at different amounts under the with- and without-project conditions.

For the Eagle class vessels (in rows 5 through 54), the sailing draft of each vessel may not exceed 40 ft in the without-project condition. The value of "40" has now been hardwired into the formulas in cells E5-BC54 on the "Distrib Comm Growth – without" page.

For the Eagle class vessels (in rows 5 through 54), the sailing draft of each vessel may not exceed 42 ft in the with-project condition. The value of "40" has now been hardwired into the formulas in cells E5-BC54 on the "Distrib Comm Growth – with" page.

Page: Draft Growth – without

The formulas in cells F2-BD127 used to reference the page named "Distrib Comm Growth". Now, they reference the page named "Distrib Comm Growth – without".

Page: Draft Growth – with

The formulas in cells F2-BD127 used to reference the page named "Distrib Comm Growth". Now, they reference the page named "Distrib Comm Growth – with".

Page: Amount Lightered – without

The formulas in cells G2-BE127 used to reference the pages named "Draft Growth" and "Amount Lightered". Now, they reference the pages named "Draft Growth – without" and "Amount Lightered – without".

In the earlier version of the model, the values in column E (lighter to) would change, based on the position of the with/without-project toggle. With the elimination of the toggle, these values are now fixed.

The values in column E are fixed at either 40 or 37 feet for the without-project condition.

Page: Amount Lightered – with

The formulas in cells G2-BE127 used to reference the pages named "Draft Growth" and "Amount Lightered". Now, they reference the pages named "Draft Growth – with" and "Amount Lightered – with".

In the earlier version of the model, the values in column E (lighter to) would change, based on the position of the with/without-project toggle. With the elimination of the toggle, these values are now fixed.

The values in column E are fixed at either 45 or 42 feet for the with-project condition.

Page: Cost at Anchorage – without

The formulas in cells D2-BB127 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

The formulas in cells D2-BB127 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the without-project lightering cost per barrel (cell B12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB127 reference the pumping rates for the without-project condition (cells C41-C45 on the "Inputs" page).

Page: Cost at Anchorage – with

The formulas in cells D2-BB127 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

The formulas in cells D2-BB127 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the with-project lightering cost per barrel (cell C12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB127 reference the pumping rates for the with-project condition (cells D41-D45 on the "Inputs" page).

Page: Cost up Channel - Without

The formulas in cells D2-BB127 used to reference data on the pages named "Distrib Comm Growth" and "Amount Lightered". Now, they reference data on the pages named "Distrib Comm Growth – without" and "Amount Lightered – without".

The formulas in cells D2-BB127 reference the time spent waiting for the tide in the without-project condition (cell B19 on the "Inputs" page).

The formulas in cells D2-BB127 reference the maximum draft for traveling at high speed up the channel in the without-project condition (cell B23 on the "Inputs" page).

Page: Cost up Channel - With

The formulas in cells D2-BB127 used to reference data on the pages named "Distrib Comm Growth" and "Amount Lightered". Now, they reference data on the pages named "Distrib Comm Growth – with" and "Amount Lightered – with".

The formulas in cells D2-BB127 reference the time spent waiting for the tide in the with-project condition (cell B20 on the "Inputs" page).

The formulas in cells D2-BB127 reference the maximum draft for traveling at high speed up the channel in the with-project condition (cell B24 on the "Inputs" page).

Page: Cost at Port – Without

The formulas in cells E2-BC127 used to reference data on the pages named "Distrib Comm Growth" and "Amount Lightered". Now, they reference data on the pages named "Distrib Comm Growth – without" and "Amount Lightered – without".

Page: Cost at Port – With

The formulas in cells E2-BC127 used to reference data on the pages named "Distrib Comm Growth" and "Amount Lightered". Now, they reference data on the pages named "Distrib Comm Growth – with" and "Amount Lightered – with".

Page: Total Costs – Without

The formulas in cells D2-BB127 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - Without".

The formulas in cells D2-BB127 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - Without".

The formulas in cells D2-BB127 used to reference data on the page named "Cost at Port". Now, they reference data on the page named "Cost at Port - Without".

Page: Total Costs – With

The formulas in cells D2-BB127 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - With".

The formulas in cells D2-BB127 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - With".

The formulas in cells D2-BB127 used to reference data on the page named "Cost at Port". Now, they reference data on the page named "Cost at Port - With".

Pages: Overweight Check – without / Overweight Check – with

In the earlier version of the model, there was only one page with distributed commodity growth ("Distrib Comm Growth"), so only one page was needed to check whether vessels were carrying excess weight. Now, the Eagle class vessels carry different amounts in the with- and without-project conditions, so any excess weight will differ between the two projects.

The formulas in cells D2-BB97 reference the page named "Distrib Comm Growth – without", for the without-project condition.

The formulas in cells D2-BB97 reference the page named "Distrib Comm Growth – with", for the with-project condition.

Model: Sun

Page: Inputs

See the comments for Model: Consolidated / Page: Global Inputs for a description of the majority of the changes made to this page.

In addition, the time spent waiting for the tide (cells B19-B20) has now been separated into values for the with- and without-project condition. In the earlier model, the value in cell B19 was calculated based on the value in the with-/without-project toggle. This value represented the average time a vessel would spend waiting for acceptable tide conditions before traveling up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B19 and B20 represent the time spent waiting for the tide in the without- and with-project conditions.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The All Facilities without-project costs in row 5 reference the without-project costs in row 10 on the Cost Summary page.

The All Facilities with-project costs in row 13 reference the with-project costs in row 49 on the Cost Summary page.

The Sun Fort Mifflin without-project costs in row 76 reference the without-project costs in row 19 on the Cost Summary page.

The Sun Fort Mifflin with-project costs in row 85 reference the with-project costs in row 58 on the Cost Summary page.

The Sun Marcus Hook without-project costs in row 94 reference the without-project costs in row 28 on the Cost Summary page.

The Sun Marcus Hook with-project costs in row 103 reference the with-project costs in row 67 on the Cost Summary page.

The Sun Hog Island without-project costs in row 112 reference the without-project costs in row 37 on the Cost Summary page.

The Sun Hog Island with-project costs in row 121 reference the with-project costs in row 76 on the Cost Summary page.

The summary of the present value of All Facilities without-project costs in cells C22 and C35 reference the without-project costs in row 9.

The summary of the present value of All Facilities with-project costs in cells C25 and C38 reference the with-project costs in row 17.

The summary of the present value of Sun Fort Mifflin without-project costs in cells D22 and C35 reference the without-project costs in row 80.

The summary of the present value of Sun Fort Mifflin with-project costs in cells D25 and C38 reference the with-project costs in row 89.

The summary of the present value of Sun Marcus Hook without-project costs in cells E22 and C35 reference the without-project costs in row 98.

The summary of the present value of Sun Marcus Hook with-project costs in cells E25 and C38 reference the with-project costs in row 107.

The summary of the present value of Sun Hog Island without-project costs in cells F22 and C35 reference the without-project costs in row 116.

The summary of the present value of Sun Hog Island with-project costs in cells F25 and C38 reference the with-project costs in row 125.

The All Facilities benefits calculated in cells C29 and C42 reference the costs calculated in cells C23 and C26 (2008-2058) and cells C36 and C39 (2009-2058).

The Sun Fort Mifflin benefits calculated in cells D29 and D42 reference the costs calculated in cells D23 and D26 (2008-2058) and cells D36 and D39 (2009-2058).

The Sun Marcus Hook benefits calculated in cells E29 and E42 reference the costs calculated in cells E23 and E26 (2008-2058) and cells E36 and E39 (2009-2058).

The Sun Hog Island benefits calculated in cells F29 and F42 reference the costs calculated in cells F23 and F26 (2008-2058) and cells F36 and F39 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Anchorage (rows 6, 15, 24 and 33) reference the "Cost at Anchorage – without" page.

The without-project Costs at Port (rows 7, 16, 25 and 34) reference the "Cost at Port – without" page.

The without-project Costs in Channel (rows 8, 17, 26 and 35) reference the "Cost up Channel – without" page.

The without-project Costs at Sea (rows 9, 18, 27 and 36) reference the "Total Costs – without" page.

The with-project Costs at Anchorage (rows 45, 54, 63 and 72) reference the "Cost at Anchorage – with" page.

The with-project Costs at Port (rows 46, 55, 64 and 73) reference the "Cost at Port – with" page.

The with-project Costs in Channel (rows 47, 56, 65 and 74) reference the "Cost up Channel – with" page.

The with-project Costs at Sea (rows 48, 57, 66 and 75) reference the "Total Costs – with" page.

Page: Tanker Database

Some of the 2000 tonnage values in column M were modified, because the Waterborne Commerce Statistics Center determined that there were errors in the database they had provided for this study. The values that have been modified are highlighted in green.

As a result of the changes to the 2000 tonnage values, some of the sailing draft information (column K) was updated as well. The values for the sailing drafts of the Stena class vessels (in the earlier version of the model) had been calculated, based on the relationship between deadweight tonnage and 2000 tonnage, so when that relationship changed, the calculated sailing draft changed as well.

Also, because a Stena class vessel was used as the representative "Additional Maximum Vessel" (added to the fleet when commodity growth demands it), the sailing drafts of every new "Additional Maximum Vessel" changed (see rows 133 to 228 for descriptive data regarding the new vessels that are added with growth in commodities).

Page: Amount Lightered – without

In the earlier version of the model, the values in column E (lighter to) would change, based on the position of the with/without-project toggle. With the elimination of the toggle, these values are now fixed.

The values in column E are fixed at either 36 feet for the Stena class vessels, or 40 or 37 feet for the remaining vessels under the without-project condition.

Page: Amount Lightered – with

In the earlier version of the model, the values in column E (lighter to) would change, based on the position of the with/without-project toggle. With the elimination of the toggle, these values are now fixed.

The values in column E are fixed at either 41 feet for the Stena class vessels, or 45 or 42 feet for the remaining vessels under the with-project condition.

Page: Cost at Anchorage – without

The formulas in cells D2-BB228 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

The formulas in cells D2-BB228 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the without-project lightering cost per barrel (cell B12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB228 reference the pumping rates for the without-project condition (cells C41-C45 on the "Inputs" page).

Page: Cost at Anchorage – with

The formulas in cells D2-BB228 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

The formulas in cells D2-BB228 used to reference a single lightering cost per ton, found on the "Inputs" page. Now, they reference the with-project lightering cost per barrel (cell C12 on the "Inputs" page), times the specific barrel/ton conversion ratio for each vessel (column W on the "Tanker Database" page).

The formulas in cells D2-BB228 reference the pumping rates for the with-project condition (cells D41-D45 on the "Inputs" page).

Page: Cost up Channel - Without

The formulas in cells D2-BB228 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

The formulas in cells D2-BB228 reference the time spent waiting for the tide in the without-project condition (cell B19 on the "Inputs" page).

The formulas in cells D2-BB228 reference the maximum draft for traveling at high speed up the channel in the without-project condition (cell B23 on the "Inputs" page).

Page: Cost up Channel - With

The formulas in cells D2-BB228 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

The formulas in cells D2-BB228 reference the time spent waiting for the tide in the with-project condition (cell B20 on the "Inputs" page).

The formulas in cells D2-BB228 reference the maximum draft for traveling at high speed up the channel in the with-project condition (cell B24 on the "Inputs" page).

Page: Cost at Port – Without

The formulas in cells E2-BC228 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – without".

Page: Cost at Port – With

The formulas in cells E2-BC228 used to reference data on the page named "Amount Lightered". Now, they reference data on the page named "Amount Lightered – with".

Page: Total Costs – Without

The formulas in cells D2-BB228 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - Without".

The formulas in cells D2-BB228 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - Without".

The formulas in cells D2-BB228 used to reference data on the page named "Cost at Port". Now, they reference data on the page named "Cost at Port - Without".

Page: Total Costs – With

The formulas in cells D2-BB228 used to reference data on the page named "Cost at Anchorage". Now, they reference data on the page named "Cost at Anchorage - With".

The formulas in cells D2-BB228 used to reference data on the page named "Cost up Channel". Now, they reference data on the page named "Cost up Channel - With".

The formulas in cells D2-BB228 used to reference data on the page named "Cost at Port". Now, they reference data on the page named "Cost at Port - With".

Model: Valero

Page: Inputs

See the comments for Model: Consolidated / Page: Global Inputs for a description of the majority of the changes made to this page.

There is no lightering of the Valero fleet, so all references to lightering costs and at-anchorage pumping rates have been eliminated.

In addition, the time spent waiting for the tide (cells B19-B20) has now been separated into values for the with- and without-project condition. In the earlier model, the value in cell B19 was calculated based on the value in the with-/without-project toggle. This

value represented the average time a vessel would spend waiting for acceptable tide conditions before traveling up the channel. With the elimination of the with-/without-project toggle, these values have been entered as fixed amounts. In the current model, cells B19 and B20 represent the time spent waiting for the tide in the without- and with-project conditions.

Page: PV Calculation

In the earlier version of the model, the annual costs and present value of costs on this page would change, depending on the position of the with-/without-project toggle. Now, the costs for both conditions are shown at the same time, and the benefits are calculated for the user.

The without-project costs in row 5 reference the without-project costs in row 7 on the Cost Summary page.

The with-project costs in row 14 reference the with-project costs in row 16 on the Cost Summary page.

The summary of the present value of without-project costs in cells D24 and D30 reference the without-project costs in row 9.

The summary of the present value of with-project costs in cells E24 and E30 reference the with-project costs in row 18.

The benefits calculated in cells F25 and F31 reference the costs calculated in cells D25-E25 (2008-2058) and cells D31-E31 (2009-2058).

The discount rate used to calculate the present value of costs was changed from 6.125% to 5.875%, to reflect the change in Federal discount rates as of October 2002.

Page: Cost Summary

In the earlier version of the model, the costs on this page changed, based on the position of the with-/without-project toggle. Now, there are separate rows for the with- and without-project costs.

The without-project Costs at Anchorage (row 3) equal zero, because there is no lightering of the Valero fleet.

The without-project Costs at Port (row 4) reference the "Cost at Port – without" page.

The without-project Costs in Channel (row 5) reference the "Cost up Channel – without" page.

The without-project Costs at Sea (row 6) reference the "Total Costs – without" page.

The with-project Costs at Anchorage (row 12) equal zero, because there is no lightering of the Valero fleet.

The with-project Costs at Port (row 13) reference the "Cost at Port – with" page.

The with-project Costs in Channel (row 14) reference the "Cost up Channel – with" page.

The with-project Costs at Sea (row 15) reference the "Total Costs – with" page.

Page: Tanker Database

Some of the 2000 tonnage values in column M were modified, because the Waterborne Commerce Statistics Center determined that there were errors in the database they had provided for this study. The values that have been modified are highlighted in green.

In the earlier version of the model, the Maximum Tons for each vessel (column W) would change, depending on the position of the with-/without-project toggle. Now, the values for the with- and without-project conditions are fixed.

Column W calculates the maximum tonnage per vessel in the without-project condition (for a maximum sailing draft of 39 ft).

Column X calculates the maximum tonnage per vessel in the with-project condition (for a maximum sailing draft of 44 ft).

Page: Distrib Comm Growth – without / Distrib Comm Growth - with

In the earlier version of the model, values on the "Distrib Comm Growth" page changed based on the position of the with-/without-project toggle. Now, those values are fixed at different amounts under the with- and without-project conditions.

As in the earlier model, the formulas in cells E2-BC206 on the "Distrib Comm Growth – without" page reference column W on the "Tanker Database" page. The difference in the new model is that the values in column W are now fixed at the maximum tonnage allowed in the without-project condition.

The formulas in column F (Tons at 44) on the "Distrib Comm Growth – with" page now reference column X on the "Tanker Database" page. This values in this column are fixed at the maximum tonnage allowed in the with-project condition.

Page: Amount Lightered – without / Amount Lightered – with

All references to lightering have been deleted from the model, because there is no lightering of the Valero fleet.

Page: Cost at Anchorage – without / Cost at Anchorage - with

All references to costs at anchorage have been deleted from the model, because there is no lightering of the Valero fleet.

Page: Cost up Channel - Without

The formulas in cells D2-BB206 reference the time spent waiting for the tide in the without-project condition (cell B19 on the "Inputs" page).

The formulas in cells D2-BB206 reference the maximum draft for traveling at high speed up the channel in the without-project condition (cell B23 on the "Inputs" page).

Page: Cost up Channel - With

The formulas in cells D2-BB157 reference the time spent waiting for the tide in the with-project condition (cell B20 on the "Inputs" page).

The formulas in cells D2-BB157 reference the maximum draft for traveling at high speed up the channel in the with-project condition (cell B24 on the "Inputs" page).

Page: Total Costs – Without

The formulas in cells D2-BB206 used to reference data on the page named "Cost at Anchorage". That page does not exist in the current version of the model, so that reference was eliminated.

Page: Total Costs – With

The formulas in cells D2-BB157 used to reference data on the page named "Cost at Anchorage". That page does not exist in the current version of the model, so that reference was eliminated.

Model: Summary Data

Page: Benefits by Facility

In the earlier version of the model, values were copied from the individual facility models and then pasted as hard values on this and other pages. Now, almost every value in this model is linked to the other facility models, so that it will update automatically as values change.

The formulas in Columns B and C (the sum of the present values of the costs for the with- and without-projects) reference values in the Consolidated models.

The formulas in Column H (total tonnage in 2000) reference the individual facility models.

Pages: Present Value Calculations / Costs – without / Costs – with / Cost Savings

These pages were in the earlier version of the model, but have been deleted in the current version of the model.

Page: Tons Lightered

This page was not in the earlier version of the model.

The formulas on this page reference the individual facility models.

MODEL CHECKLISTS

Once the model modifications were complete, the following checklists were prepared and used to verify that all of the necessary modifications were made completely and accurately.

Model: Container Vessels

Page: Container Inputs

The formulas in cells C41-C42 reference the correct costs in the VOC-Nov2002 file.

Page: Benefits

The formulas in cells B6-AY6 reference the correct page (Container Costs – Without) and year (2009 through 2058).

The formulas in cells B19-AY19 reference the correct page (Container Costs – With) and year (2009 through 2058).

The formula in cell B8 captures all years of data (cells B6-AY6).

The formula in cell B21 captures all years of data (cells B19-AY19).

The formulas in cells B9 and B22 use the correct discount rate.

Pages: Container Costs – Without / Container Costs - With

The formulas in cells B6-AY6 reference the correct years (cells C10-BF10) on the Annual TEU Volumes page.

The Cost Per Vessel formula in cells B10-AY10 reference the correct mileage on the Mileage Check page (cell D7 for without-project and cell H7 for with-project).

The formulas in cells B18-AY18 calculate the present value of costs using the correct discount rate.

The present value of costs for each year (row 18) are always less than or equal to the annual costs for that year (row 14).

The number of vessel calls per year (row 6) is identical in the with- and without-project condition.

Page: Annual TEU Volumes

The growth rates used to calculate Annual TEU's (row 6) reference the correct fields (cells D5-I5) on the Container Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Model: Bulkers

Page: Inputs

The formulas in cells B9-C10 reference the correct costs in the VOC-Nov2002 file.

Page: PV Calculation

The formulas in cells C6-AZ6 reference the correct row and years (cells B7-AY7) on the Cost Summary page.

The formulas in cells C7-AZ7 reference the correct row and years (cells B13-AY13) on the Cost Summary page.

The formulas in cells C13-AZ14 use the correct discount rate.

The present value of without-project costs for each year (row 15) are always less than or equal to the annual costs for that year (row 8).

The formulas in cells C25-AZ25 reference the correct row and years (cells B29-AY29) on the Cost Summary page.

The formulas in cells C2-AZ26 reference the correct row and years (cells B35-AY35) on the Cost Summary page.

The formulas in cells C32-AZ33 use the correct discount rate.

The present value of with-project costs for each year (row 34) are always less than or equal to the annual costs for that year (row 27).

The formulas in cell C44, D44, G44 and H44 capture all years of data (columns C to AZ).

The formulas in cell C45, D45, G45 H45, C50 and D50 use the correct discount rate.

The value in cell C50 equals cell C45 minus cell G45.

The value in cell D50 equals cell D45 minus cell H45.

Page: Cost Summary

The formulas in cells B4-AY4 reference the correct rows and years (cells E2-BB22) on the Cost Port - WO page.

The formulas in cells B5-AY5 reference the correct rows and years (cells D2-BA22) on the Cost Channel - WO page.

The formulas in cells B6-AY6 reference the correct rows and years (cells D2-BA22) on the Total Costs - WO page.

For each year, the sum of values in rows 4 through 6 is equal to the sum of rows 2 through 22 on the Total Costs – WO page.

The formulas in cells B10-AY10 reference the correct rows and years (cells E25-BB130) on the Cost Port - WO page.

The formulas in cells B11-AY11 reference the correct rows and years (cells D25-BA130) on the Cost Channel - WO page.

The formulas in cells B12-AY12 reference the correct rows and years (cells D25-BA130) on the Total Costs - WO page.

For each year, the sum of values in rows 10 through 12 is equal to the sum of rows 25 through 130 on the Total Costs – WO page.

The formulas in cells B26-AY26 reference the correct rows and years (cells E2-BB22) on the Cost Port - WITH page.

The formulas in cells B27-AY27 reference the correct rows and years (cells D2-BA22) on the Cost Channel - WITH page.

The formulas in cells B28-AY28 reference the correct rows and years (cells D2-BA22) on the Total Costs - WITH page.

For each year, the sum of values in rows 26 through 28 is equal to the sum of rows 2 through 22 on the Total Costs – WITH page.

The formulas in cells B32-AY32 reference the correct rows and years (cells E25-BB89) on the Cost Port - WITH page.

The formulas in cells B33-AY33 reference the correct rows and years (cells D25-BA89) on the Cost Channel - WITH page.

The formulas in cells B34-AY34 reference the correct rows and years (cells D25-BA89) on the Total Costs - WITH page.

For each year, the sum of values in rows 32 through 34 is equal to the sum of rows 25 through 89 on the Total Costs – WITH page.

Page: Actual Comm Growth – WO

The growth rates used for slabs vessels (cells E10-BB28) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Gro – WO

The sum of rows 2 through 22 equals 1,000,000 in each year (2009-2058).

The sum of rows 25 to 130 equals the sum of rows 10 to 28 on the "Actual Comm Growth – WO" page in each year (2009-2058).

No vessel is carrying negative tonnage.

Page: Draft Grow – WO

No slag vessel has a sailing draft greater than 40 feet.

No slabs vessel has a sailing draft greater than 39 feet.

Page: Cost Channel – WO

The formulas on this page reference the correct years on the following pages: "Distrib Comm Gro – WO" and "Draft Growth – WO".

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

Page: Cost Port – WO

The formulas on this page reference the correct years on the "Distrib Comm Gro – WO" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – WO

The formulas on this page reference the correct years on the following pages: "Cost Channel – WO" and "Cost Port – WO".

Page: SLABS Overweight – WO

The formulas on this page reference the correct rows and years on the following pages: "Actual Comm Growth – WO" and "Distrib Comm Gro – WO".

The sums in row 23 include all rows from 2 through 20.

Page: Distrib Comm Gro – WITH

The sum of rows 2 through 22 equals 1,000,000 in each year (2009-2058).

The sum of rows 25 to 129 equals the sum of rows 10 to 28 on the "Actual Comm Growth – WO" page in each year (2009-2058).

No vessel is carrying negative tonnage.

Page: Draft Grow – WITH

No slag vessel has a sailing draft greater than 45 feet.

No slabs vessel has a sailing draft greater than 44 feet.

Page: Cost Channel – WITH

The formulas on this page reference the correct years on the following pages: "Distrib Comm Gro – WITH" and "Draft Growth – WITH".

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

Page: Cost Port – WITH

The formulas on this page reference the correct years on the "Distrib Comm Gro – WITH" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – WITH

The formulas on this page reference the correct years on the following pages: "Cost Channel – WITH" and "Cost Port – WITH".

Model: Delaware Terminal

Page: Inputs

The formulas in cells B9-C10 reference the correct costs in the VOC-Nov2002 file.

Page: PV Calculation

The formulas in cells C4-BA4 reference the correct row and years (cells B7-AZ7) on the Cost Summary page.

The formulas in cells C8-BA8 use the correct discount rate.

The present value of without-project costs (row 8) for each year (except 2008) are always less than or equal to the annual costs for that year (row 4).

The formulas in cells C12-BA12 reference the correct row and years (cells B14-AZ14) on the Cost Summary page.

The formulas in cells C16-BA16 use the correct discount rate.

The present value of without-project costs (row 16) for each year (except 2008) are always less than or equal to the annual costs for that year (row 12).

The formulas in cell C21, D21 capture all years of data (columns C through BA).

The formulas in cell C27, D27 capture all years of data (columns D through BA).

The formulas in cell C22, D22, C28 and D28 use the correct discount rate.

Page: Cost Summary

The formulas in cells B4-AZ4 reference the correct rows and years (cells E2-BC33) on the Cost Port - WO page.

The formulas in cells B5-AZ5 reference the correct rows and years (cells D2-BB33) on the Cost Channel - WO page.

The formulas in cells B6-AZ6 reference the correct rows and years (cells D2-BB33) on the Total Costs - WO page.

For each year, the sum of values in rows 4 through 6 is equal to the sum of rows 2 through 22 on the Total Costs – WO page.

The formulas in cells B11-AZ11 reference the correct rows and years (cells E2-BC21) on the Cost Port - WITH page.

The formulas in cells B12-AZ12 reference the correct rows and years (cells D2-BB21) on the Cost Channel - WITH page.

The formulas in cells B13-AZ13 reference the correct rows and years (cells D2-BB21) on the Total Costs - WITH page.

For each year, the sum of values in rows 11 through 13 is equal to the sum of rows 2 through 21 on the Total Costs – WITH page.

Page: Actual Comm Growth – WO

The growth rates (referenced in cells E2-BC13) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Gro – WO

The formulas in column D reference the without-project Max Tons values (column W) in the "DelTerminal Database" page.

The sum of rows 2 to 33 equals the sum of rows 2 to 13 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Page: Draft Grow – WO

No vessel has a sailing draft greater than 40 feet.

Page: Cost Channel – WO

The formulas on this page reference the correct years on the following pages: "Distrib Comm Gro – WO" and "Draft Growth – WO".

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B16) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B19) on the "Inputs" page.

Page: Cost Port – WO

The formulas on this page reference the correct years on the "Distrib Comm Gro – WO" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – WO

The formulas on this page reference the correct years on the following pages: "Cost Channel – WO" and "Cost Port – WO".

Page: SLABS Overweight – WO

The formulas on this page reference the correct rows and years on the following pages: "Actual Comm Growth" and "Distrib Comm Gro – WO".

The sums in row 16 include all rows from 2 through 13.

Page: Rep Vessels – WITH

The formulas in column W reference the with-project Max Tons values (column X) in the "DelTerminal Database" page.

Page: Distrib Comm Gro – WITH

The sum of rows 2 to 23 equals the sum of rows 2 to 13 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Page: Draft Grow – WITH

No vessel has a sailing draft greater than 45 feet.

Page: Cost Channel – WITH

The formulas on this page reference the correct years on the following pages: "Distrib Comm Gro – WITH" and "Draft Growth – WITH".

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B17) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B20) on the "Inputs" page.

Page: Cost Port – WITH

The formulas on this page reference the correct years on the "Distrib Comm Gro – WITH" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – WITH

The formulas on this page reference the correct years on the following pages: "Cost Channel – WITH" and "Cost Port – WITH".

Model: Consolidated

Page: Global Inputs

The formulas in cells B9-C10 reference the correct costs in the VOC-Nov2002 file.

The formulas in cells B12-C12 reference the correct costs in the Maritrans VOC file.

The at-anchorage pumping rates for with- and without-project conditions (cells C43-D47) reference the correct weighted-average calculations.

Page: Total Benefits

The formulas in cells C5-BA5 reference the correct row and years (cells B9-AZ9) on the Costs page.

The formulas in cells C9-BA9 use the correct discount rate.

The present value of without-project costs (row 9) for each year (except 2008) are always less than or equal to the annual costs for that year (row 5).

The formulas in cells C13-BA13 reference the correct row and years (cells B19-AZ19) on the Costs page.

The formulas in cells C17-BA17 use the correct discount rate.

The present value of without-project costs (row 17) for each year (except 2008) are always less than or equal to the annual costs for that year (row 13).

The formulas in cell D24, E24 capture all years of data (columns C through BA).

The formulas in cell D29, E29 capture all years of data (columns D through BA).

The formulas in cell D25, E25, D30, and E30 use the correct discount rate.

Page: Facility Benefits

The formulas in cells B8-C14 reference the correct page and cell in each of the individual tanker facility models.

The value in cell D15 equals the value in cell F25 on the "Total Benefits" page.

Page: Costs

The formulas in cells B5-AZ8 reference the correct cells in the without-project section of the "Cost Summary" page for each individual tanker facility model.

The formulas in cells B15-AZ18 reference the correct cells in the with-project section of the "Cost Summary" page for each individual tanker facility model.

Page: Future Tonnage

The formulas in row 6 reference the correct cells in the "Distrib Comm Gro – WO" page of each individual tanker facility model.

The formulas in row 8 reference the correct cells in the "Amount Lightered – WO" page of each individual tanker facility model.

The formulas in row 20 reference the correct cells in the "Distrib Comm Gro – WITH" page of each individual tanker facility model.

The formulas in row 22 reference the correct cells in the "Amount Lightered – WITH" page of each individual tanker facility model.

For each year, the value in row 6 equals the value in row 20.

For each year, the value in row 8 is greater than the value in row 22.

Model: Eagle Pt

Page: Inputs

All inputs are linked to the correct cells in the "Global Inputs" page of the Consolidated file.

Page: PV Calculation

The formulas in cells C5-BA5 reference the correct row and years (cells B7-AZ7) on the Cost Summary page.

The formulas in cells C9-BA9 use the correct discount rate.

The present value of without-project costs (row 9) for each year (except 2008) are always less than or equal to the annual costs for that year (row 5).

The formulas in cells C13-BA13 reference the correct row and years (cells B16-AZ16) on the Cost Summary page.

The formulas in cells C17-BA17 use the correct discount rate.

The present value of without-project costs (row 17) for each year (except 2008) are always less than or equal to the annual costs for that year (row 13).

The formulas in cell D22, E22 capture all years of data (columns C through BA).

The formulas in cell D28, E28 capture all years of data (columns D through BA).

The formulas in cell D23, E23, D29 and E29 use the correct discount rate.

Page: Cost Summary

The formulas in cells B3-AZ3 reference the correct rows and years (cells D2-BB94) on the "Cost at Anchorage – without" page.

The formulas in cells B4-AZ4 reference the correct rows and years (cells E2-BC94) on the "Costs at Port – without" page.

The formulas in cells B5-AZ5 reference the correct rows and years (cells D2-BB94) on the "Costs up Channel – without" page.

The formulas in cells B6-AZ6 reference the correct rows and years (cells D2-BB94) on the "Total Costs – without" page.

For each year, the sum of values in rows 3 through 6 is equal to the sum of rows 2 through 94 on the "Total Costs – without" page.

The formulas in cells B12-AZ12 reference the correct rows and years (cells D2-BB94) on the "Cost at Anchorage – with" page.

The formulas in cells B13-AZ13 reference the correct rows and years (cells E2-BC94) on the "Costs at Port – with" page.

The formulas in cells B14-AZ14 reference the correct rows and years (cells D2-BB94) on the "Costs up Channel – with" page.

The formulas in cells B15-AZ15 reference the correct rows and years (cells D2-BB94) on the "Total Costs – with" page.

For each year, the sum of values in rows 12 through 15 is equal to the sum of rows 2 through 94 on the "Total Costs – with" page.

Page: Actual Comm Growth

The growth rates (referenced in cells E2-BC40) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Growth

The sum of rows 2 to 94 equals the sum of rows 2 to 40 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Pages: Amount Lightered – without / Amount Lightered – with

For each year, the total amount lightered in the with-project condition is less than or equal to the total amount lightered in the without-project condition.

Page: Cost at Anchorage – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct lightering cost for the without-project condition (cell B12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost at Anchorage – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct lightering cost for the with-project condition (cell C12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost up Channel – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B19) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B23) on the "Inputs" page.

Page: Cost up Channel – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B20) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B24) on the "Inputs" page.

Page: Cost at Port – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost at Port – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – without

The formulas on this page reference the correct years on the "Cost at Anchorage – without" page.

The formulas on this page reference the correct years on the "Cost up Channel – without" page.

The formulas on this page reference the correct years on the "Cost at Port – without" page.

Page: Total Costs – with

The formulas on this page reference the correct years on the "Cost at Anchorage – with" page.

The formulas on this page reference the correct years on the "Cost up Channel – with" page.

The formulas on this page reference the correct years on the "Cost at Port – with" page.

Page: Overweight Check

The formulas on this page reference the correct rows and years on the following pages: "Actual Comm Growth" and "Tanker Database".

The sums in row 42 include all rows from 2 through 40.

Model: Motiva

Page: Inputs

All inputs are linked to the correct cells in the "Global Inputs" page of the Consolidated file.

Page: PV Calculation

The formulas in cells C5-BA5 reference the correct row and years (cells B7-AZ7) on the Cost Summary page.

The formulas in cells C9-BA9 use the correct discount rate.

The present value of without-project costs (row 9) for each year (except 2008) are always less than or equal to the annual costs for that year (row 5).

The formulas in cells C13-BA13 reference the correct row and years (cells B16-AZ16) on the Cost Summary page.

The formulas in cells C17-BA17 use the correct discount rate.

The present value of without-project costs (row 17) for each year (except 2008) are always less than or equal to the annual costs for that year (row 13).

The formulas in cell D23, E23 capture all years of data (columns C through BA).

The formulas in cell D29, E29 capture all years of data (columns D through BA).

The formulas in cell D24, E24, D30 and E30 use the correct discount rate.

Page: Cost Summary

The formulas in cells B3-AZ3 reference the correct rows and years (cells D2-BB130) on the "Cost at Anchorage – without" page.

The formulas in cells B4-AZ4 reference the correct rows and years (cells E2-BC130) on the "Costs at Port" page.

The formulas in cells B5-AZ5 reference the correct rows and years (cells D2-BB130) on the "Costs up Channel – without" page.

The formulas in cells B6-AZ6 reference the correct rows and years (cells D2-BB130) on the "Total Costs – without" page.

For each year, the sum of values in rows 3 through 6 is equal to the sum of rows 2 through 130 on the "Total Costs – without" page.

The formulas in cells B12-AZ12 reference the correct rows and years (cells D2-BB130) on the "Cost at Anchorage – with" page.

The formulas in cells B13-AZ13 reference the correct rows and years (cells E2-BC130) on the "Costs at Port" page.

The formulas in cells B14-AZ14 reference the correct rows and years (cells D2-BB130) on the "Costs up Channel – with" page.

The formulas in cells B15-AZ15 reference the correct rows and years (cells D2-BB130) on the "Total Costs – with" page.

For each year, the sum of values in rows 12 through 15 is equal to the sum of rows 2 through 130 on the "Total Costs – with" page.

Page: Actual Comm Growth

The growth rates (referenced in cells E2-BC85) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Growth

The sum of rows 2 to 130 equals the sum of rows 2 to 85 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Page: Amount Lightered

The values in column E (Lighter to) all equal 38 ft (since all vessels must lighter to 38 ft for Motiva).

Page: Cost at Anchorage – without

The formulas on this page reference the correct years on the "Amount Lightered" page.

The formulas on this page reference the correct lightering cost for the without-project condition (cell B12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost at Anchorage – with

The formulas on this page reference the correct years on the "Amount Lightered" page.

The formulas on this page reference the correct lightering cost for the with-project condition (cell C12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost up Channel – without

The formulas on this page reference the correct years on the "Amount Lightered" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B19) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B23) on the "Inputs" page.

Page: Cost up Channel – with

The formulas on this page reference the correct years on the "Amount Lightered" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B20) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B24) on the "Inputs" page.

Page: Cost at Port

The formulas on this page reference the correct years on the "Amount Lightered" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – without

The formulas on this page reference the correct years on the "Cost at Anchorage – without" page.

The formulas on this page reference the correct years on the "Cost up Channel – without" page.

The formulas on this page reference the correct years on the "Cost at Port" page.

Page: Total Costs – with

The formulas on this page reference the correct years on the "Cost at Anchorage – with" page.

The formulas on this page reference the correct years on the "Cost up Channel – with" page.

The formulas on this page reference the correct years on the "Cost at Port" page.

Page: Overweight Check

The formulas on this page reference the correct rows and years on the following pages: "Actual Comm Growth" and "Tanker Database".

The sums in row 87 include all rows from 2 through 85.

Model: Tosco

Page: Inputs

All inputs are linked to the correct cells in the "Global Inputs" page of the Consolidated file.

Page: PV Calculation

The formulas in cells C5-BA5 reference the correct row and years (cells B7-AZ7) on the Cost Summary page.

The formulas in cells C9-BA9 use the correct discount rate.

The present value of without-project costs (row 9) for each year (except 2008) are always less than or equal to the annual costs for that year (row 5).

The formulas in cells C13-BA13 reference the correct row and years (cells B16-AZ16) on the Cost Summary page.

The formulas in cells C17-BA17 use the correct discount rate.

The present value of without-project costs (row 17) for each year (except 2008) are always less than or equal to the annual costs for that year (row 13).

The formulas in cell D22, E22 capture all years of data (columns C through BA).

The formulas in cell D28, E28 capture all years of data (columns D through BA).

The formulas in cell D23, E23, D29 and E29 use the correct discount rate.

Page: Cost Summary

The formulas in cells B3-AZ3 reference the correct rows and years (cells D2-BB127) on the "Cost at Anchorage – without" page.

The formulas in cells B4-AZ4 reference the correct rows and years (cells E2-BC127) on the "Costs at Port – without" page.

The formulas in cells B5-AZ5 reference the correct rows and years (cells D2-BB127) on the "Costs up Channel – without" page.

The formulas in cells B6-AZ6 reference the correct rows and years (cells D2-BB127) on the "Total Costs – without" page.

For each year, the sum of values in rows 3 through 6 is equal to the sum of rows 2 through 127 on the "Total Costs – without" page.

The formulas in cells B12-AZ12 reference the correct rows and years (cells D2-BB127) on the "Cost at Anchorage – with" page.

The formulas in cells B13-AZ13 reference the correct rows and years (cells E2-BC127) on the "Costs at Port – with" page.

The formulas in cells B14-AZ14 reference the correct rows and years (cells D2-BB127) on the "Costs up Channel – with" page.

The formulas in cells B15-AZ15 reference the correct rows and years (cells D2-BB127) on the "Total Costs – with" page.

For each year, the sum of values in rows 12 through 15 is equal to the sum of rows 2 through 127 on the "Total Costs – with" page.

Page: Actual Comm Growth

The growth rates (referenced in cells E2-BC97) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Growth - without

The sum of rows 2 to 127 equals the sum of rows 2 to 97 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Page: Distrib Comm Growth - with

The sum of rows 2 to 127 equals the sum of rows 2 to 97 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Page: Draft Growth – without

The formulas in cells F2-BD127 reference the correct rows and years on the "Distrib Comm Growth – without" page.

No Eagle class vessel has a sailing draft greater than 40 ft.

Page: Draft Growth – with

The formulas in cells F2-BD127 reference the correct rows and years on the "Distrib Comm Growth – with" page.

No Eagle class vessel has a sailing draft greater than 42 ft.

Pages: Amount Lightered – without / Amount Lightered – with

For each year, the total amount lightered in the with-project condition is less than or equal to the total amount lightered in the without-project condition.

Page: Cost at Anchorage – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct lightering cost for the without-project condition (cell B12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost at Anchorage – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct lightering cost for the with-project condition (cell C12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost up Channel – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B19) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B23) on the "Inputs" page.

Page: Cost up Channel – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B20) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B24) on the "Inputs" page.

Page: Cost at Port – without

The formulas on this page reference the correct years on the "Distrib Comm Growth – without" and "Amount Lightered – without" pages.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost at Port – with

The formulas on this page reference the correct years on the "Distrib Comm Growth – with" and "Amount Lightered – with" pages.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – without

The formulas on this page reference the correct years on the "Cost at Anchorage – without" page.

The formulas on this page reference the correct years on the "Cost up Channel – without" page.

The formulas on this page reference the correct years on the "Cost at Port – without" page.

Page: Total Costs – with

The formulas on this page reference the correct years on the "Cost at Anchorage – with" page.

The formulas on this page reference the correct years on the "Cost up Channel – with" page.

The formulas on this page reference the correct years on the "Cost at Port – with" page.

Page: Overweight Check - without

The formulas on this page reference the correct rows and years on the "Actual Comm Growth" and "Distrib Comm Growth – without" pages.

The sums in row 99 include all rows from 2 through 97.

Page: Overweight Check - with

The formulas on this page reference the correct rows and years on the "Actual Comm Growth" and "Distrib Comm Growth – with" pages.

The sums in row 99 include all rows from 2 through 97.

Model: Sun

Page: Inputs

All inputs are linked to the correct cells in the "Global Inputs" page of the Consolidated file.

Page: PV Calculation

The formulas in cells C5-BA5 reference the correct row and years (cells B10-AZ10) on the Cost Summary page.

The formulas in cells C9-BA9 use the correct discount rate.

The present value of without-project costs (row 9) for each year (except 2008) are always less than or equal to the annual costs for that year (row 5).

The formulas in cells C13-BA13 reference the correct row and years (cells B49-AZ49) on the Cost Summary page.

The formulas in cells C17-BA17 use the correct discount rate.

The present value of without-project costs (row 17) for each year (except 2008) are always less than or equal to the annual costs for that year (row 13).

The formulas in cells C76-BA76 reference the correct row and years (cells B19-AZ19) on the Cost Summary page.

The formulas in cells C80-BA80 use the correct discount rate.

The present value of without-project costs (row 80) for each year (except 2008) are always less than or equal to the annual costs for that year (row 76).

The formulas in cells C85-BA85 reference the correct row and years (cells B58-AZ58) on the Cost Summary page.

The formulas in cells C89-BA89 use the correct discount rate.

The present value of without-project costs (row 89) for each year (except 2008) are always less than or equal to the annual costs for that year (row 85).

The formulas in cells C94-BA94 reference the correct row and years (cells B28-AZ28) on the Cost Summary page.

The formulas in cells C98-BA98 use the correct discount rate.

The present value of without-project costs (row 98) for each year (except 2008) are always less than or equal to the annual costs for that year (row 94).

The formulas in cells C103-BA103 reference the correct row and years (cells B67-AZ67) on the Cost Summary page.

The formulas in cells C107-BA107 use the correct discount rate.

The present value of without-project costs (row 107) for each year (except 2008) are always less than or equal to the annual costs for that year (row 103).

The formulas in cells C112-BA112 reference the correct row and years (cells B37-AZ37) on the Cost Summary page.

The formulas in cells C116-BA116 use the correct discount rate.

The present value of without-project costs (row 116) for each year (except 2008) are always less than or equal to the annual costs for that year (row 112).

The formulas in cells C121-BA121 reference the correct row and years (cells B76-AZ76) on the Cost Summary page.

The formulas in cells C125-BA125 use the correct discount rate.

The present value of without-project costs (row 125) for each year (except 2008) are always less than or equal to the annual costs for that year (row 121).

The formulas in cell C22, C25, D22, D25, E22, E25, F22 and F25 capture all years of data (columns C through BA).

The formulas in cell C35, C38, D35, D38, E35, E38, F35 and F38 capture all years of data (columns D through BA).

The formulas in cell C36, C39, D36, D39, E36, E39, F36 and F39 use the correct discount rate.

Page: Cost Summary

The formulas in rows 6, 15, 24 and 33 reference the correct rows and years on the "Cost at Anchorage – without" page.

The formulas in rows 7, 16, 25 and 34 reference the correct rows and years on the "Costs at Port – without" page.

The formulas in rows 8, 17, 26 and 35 reference the correct rows and years on the "Costs up Channel – without" page.

The formulas in rows 9, 18, 27 and 36 reference the correct rows and years on the "Total Costs – without" page.

For each year, the sum of values in rows 6 through 9 is equal to the sum of rows 239-241 on the "Total Costs – without" page.

The formulas in rows 45, 54, 63 and 72 reference the correct rows and years on the "Cost at Anchorage – with" page.

The formulas in rows 46, 55, 64 and 73 reference the correct rows and years on the "Costs at Port – with" page.

The formulas in rows 47, 56, 65 and 74 reference the correct rows and years on the "Costs up Channel – with" page.

The formulas in cells 48, 57, 66, 75 reference the correct rows and years on the "Total Costs – with" page.

For each year, the sum of values in rows 45 through 48 is equal to the sum of rows 239-241 on the "Total Costs – with" page.

Page: Actual Comm Growth

The growth rates (referenced in cells E2-BC132) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Growth

The sum of rows 2 to 228 equals the sum of rows 2 to 132 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Pages: Amount Lightered – without / Amount Lightered – with

For each year, the total amount lightered in the with-project condition is less than or equal to the total amount lightered in the without-project condition.

Page: Cost at Anchorage – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct lightering cost for the without-project condition (cell B12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Cost at Anchorage – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct lightering cost for the with-project condition (cell C12 on the "Inputs" page).

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Cost up Channel – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B19) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B23) on the "Inputs" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Cost up Channel – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B20) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B24) on the "Inputs" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Cost at Port – without

The formulas on this page reference the correct years on the "Amount Lightered – without" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Cost at Port – with

The formulas on this page reference the correct years on the "Amount Lightered – with" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Total Costs – without

The formulas on this page reference the correct years on the "Cost at Anchorage – without" page.

The formulas on this page reference the correct years on the "Cost up Channel – without" page.

The formulas on this page reference the correct years on the "Cost at Port – without" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Total Costs – with

The formulas on this page reference the correct years on the "Cost at Anchorage – with" page.

The formulas on this page reference the correct years on the "Cost up Channel – with" page.

The formulas on this page reference the correct years on the "Cost at Port – with" page.

For each year, the sum of lines 231-237 equals the sum of lines 2-228.

Page: Overweight Check

The formulas on this page reference the correct rows and years on the following pages: "Actual Comm Growth" and "Distrib Comm Growth".

The sums in row 134 include all rows from 2 through 132.

Model: Valero

Page: Inputs

All inputs are linked to the correct cells in the "Global Inputs" page of the Consolidated file.

Page: PV Calculation

The formulas in cells C5-BA5 reference the correct row and years (cells B7-AZ7) on the Cost Summary page.

The formulas in cells C9-BA9 use the correct discount rate.

The present value of without-project costs (row 9) for each year (except 2008) are always less than or equal to the annual costs for that year (row 5).

The formulas in cells C14-BA14 reference the correct row and years (cells B16-AZ16) on the Cost Summary page.

The formulas in cells C18-BA18 use the correct discount rate.

The present value of without-project costs (row 18) for each year (except 2008) are always less than or equal to the annual costs for that year (row 14).

The formulas in cell D24, E24 capture all years of data (columns C through BA).

The formulas in cell D30, E30 capture all years of data (columns D through BA).

The formulas in cell D25, E25, D31 and E31 use the correct discount rate.

Page: Cost Summary

Cells B3-AZ3 equal zero.

The formulas in cells B4-AZ4 reference the correct rows and years (cells E2-BC206) on the "Costs at Port – without" page.

The formulas in cells B5-AZ5 reference the correct rows and years (cells D2-BB127) on the "Costs up Channel – without" page.

The formulas in cells B6-AZ6 reference the correct rows and years (cells D2-BB206) on the "Total Costs – without" page.

For each year, the sum of values in rows 3 through 6 is equal to the sum of rows 2 through 206 on the "Total Costs – without" page.

Cells B12-AZ12 equal zero.

The formulas in cells B13-AZ13 reference the correct rows and years (cells E2-BC157) on the "Costs at Port – with" page.

The formulas in cells B14-AZ14 reference the correct rows and years (cells D2-BB157) on the "Costs up Channel – with" page.

The formulas in cells B15-AZ15 reference the correct rows and years (cells D2-BB157) on the "Total Costs – with" page.

For each year, the sum of values in rows 12 through 15 is equal to the sum of rows 2 through 157 on the "Total Costs – with" page.

Page: Tonnage Summary

The formulas in rows 7 and 8 reference the correct years on the "Distrib Comm Growth – without" page.

The formulas in rows 18 and 19 reference the correct years on the "Distrib Comm Growth – with" page.

Page: Actual Comm Growth

The growth rates (referenced in cells E2-BC95) reference the correct fields (cells B5-G5) on the Inputs page. The cell references should change in years 2011, 2021, 2031, 2041, 2051.

Page: Distrib Comm Growth - without

The sum of rows 2 to 206 equals the sum of rows 2 to 95 on the "Actual Comm Growth" page in each year (2008-2058).

No vessel is carrying negative tonnage.

Page: Distrib Comm Growth - with

The sum of rows 2 to 157 equals the sum of rows 2 to 95 on the "Actual Comm Growth" page in each year (2008-2058).

Column F (Tons at 44) references Column X on the "Tanker Database" page.

No vessel is carrying negative tonnage.

Page: Draft Growth – without

The formulas in cells F2-BD206 reference the correct rows and years on the "Distrib Comm Growth – without" page.

No vessel has a sailing draft greater than 39 ft.

Page: Draft Growth – with

The formulas in cells F2-BD157 reference the correct rows and years on the "Distrib Comm Growth – with" page.

No vessel has a sailing draft greater than 44 ft.

Page: Cost up Channel – without

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B19) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B23) on the "Inputs" page.

Page: Cost up Channel – with

The formulas on this page reference the correct vessel operating cost factors (at-sea costs) on the "Inputs" page.

The formulas on this page reference the correct time spent waiting for the tide (cell B20) on the "Inputs" page.

The formulas on this page reference the correct maximum draft for high speed up the channel (cell B24) on the "Inputs" page.

Page: Cost at Port – without

The formulas on this page reference the correct years on the "Distrib Comm Growth – without" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Cost at Port – with

The formulas on this page reference the correct years on the "Distrib Comm Growth – with" page.

The formulas on this page reference the correct vessel operating cost factors (in-port costs) on the "Inputs" page.

Page: Total Costs – without

The formulas on this page reference the correct years on the "Cost up Channel – without" page.

The formulas on this page reference the correct years on the "Cost at Port – without" page.

Page: Total Costs – with

The formulas on this page reference the correct years on the "Cost up Channel – with" page.

The formulas on this page reference the correct years on the "Cost at Port – with" page.

Page: Overweight Check

The formulas on this page reference the correct rows and years on the "Actual Comm Growth" and "Distrib Comm Growth – without" pages.

The sums in row 97 include all rows from 2 through 95.

Page: Origin Summaries

The formulas on this page reference the correct rows and years on the "Actual Comm Growth" page.

The sum of values in rows 98 plus 99 equals the sum of values in rows 2 through 95.

Model: Summary Data

Page: Total Tanker Benefits

The formulas on this page reference the correct cells on the "Benefits by Facility" and "2000 Tonnage Check" pages.

The value in cell B13 (Total Tanker Benefits) equals the value in cell F25 of the "Total Benefits" page of the Consolidated model.

Page: Benefits by Facility

The formulas in columns B and C on this page reference the correct cells in the Consolidated model.

The formulas in column H on this page reference the correct facility models.

Page: Tons Lightered

The formulas on this page reference the correct facility models.

Quality Control Review of Final Delaware Report Changes

Once model modifications were made and verified, documentation of those changes were made in the Main Report and Appendix C – Benefits by the study team. In addition, a number of additions, deletions, and modifications to the text were made to provide supplemental material, describe revised analytical approaches (e.g., use of lightering *costs* rather than *prices*), and correct past confusion that existed between the text descriptions and model inputs.

The internal technical review team reviewed the changes made in the text documents in Microsoft Word track changes mode to verify the accuracy of the changes and that they completely addressed all comments raised by HQUSACE and EITR reviewers. Provided below is the internal technical review team's evaluation of the changes made in the report, presented in a checklist format.

Documentation and Evaluation of Report Changes

- Global changes
    - All report references, and costs and benefits tables have been revised to show the prevailing FY 2003 Federal discount rate of 5-7/8%.
- Container Benefits Discussions
    - Analysis has been performed on forecasted departure drafts from Savannah (arrival drafts at Philadelphia) that indicate the estimated year in which without-project channel depths at the Delaware River constrain arrival drafts for the planned eastbound P&O/Columbus Line VSA service from Australia/New Zealand.
    - Analysis showing why container vessels cannot use tidal advantage from Savannah to Philadelphia has been performed and documentation included in Appendix C.
    - A discussion of load shifts from refrigerated cargo vessels to reefer ships has been included in Appendix C.
    - A discussion of productive use of time savings to support using at sea costs for benefiting containerships has been included in Appendix C.
    - Comparisons have been presented on historic containerized cargo tonnage (total and ANZ) at Philadelphia to DRI-WEFA projected growth rates. Where commodity histories show significant variability, the reasons for variability and the outlook for future variability have been discussed in Appendix C.
    - An explanation has been added to Appendix C to explain that the DRI-WEFA graphs and tables in Attachment 1 showing commodity growth

projections are slightly out of date, since they were based on earlier versions of the DRI-WEFA model.

- Supplement text has been added to Appendix C to describe the new benefiting liner service, including service start date info, and ships to be used on the service. It is noted that additional vessel names and descriptions have been provided that were obtained from VSA member (P&O Nedlloyd and Contship) website descriptions of vessel sailing schedules for the next 3 months. Descriptions of without-project and with-project port rotations have been expanded to clearly portray the basis for the benefits claimed.
- The design draft of the new Albatross Class vessels has been verified and the descriptions changed in Appendix C to indicate that the design draft of the vessels is 12.5 meters (41 feet). It has also been verified that the design draft (and TEU capacity) of the Contship and Columbus Line vessels scheduled for this service are the same.
- An explanation has been added to Appendix C to describe that regression equations were generated from the IWR VOC tables in order to calculate at sea and at port costs for vessels whose DWT fell between the categories listed in the VOC tables.

- Bulker Benefits
  - Steel Slabs
    - Historic data (PIERS and WCSC) has been included in Appendix C and compared to DRI-WEFA growth rates. Where commodity histories show significant variability, the reasons for variability and the outlook for future variability were discussed.
    - Historic data on vessel characteristics and sailing drafts have been included in Appendix C.
    - Additional discussion on the reasons for recent dips in imports and the impacts of tariffs has been included in Appendix C.
    - Additional discussion has been included in Appendix C on the rationale for selection of the with project fleet.
    - Additional discussion has been included in Appendix C providing the depth at the principal foreign origin port for the steel slab traffic and indicating that it has sufficient depth to fully load the with project condition vessels to full channel depth.
    - The additional without project condition vessels needed to handle future growth in tonnage have been changed in the models and are described in Appendix C.

- Blast Furnace Slag
  - An expanded discussion has been included in Appendix C to describe the national market for blast furnace slag to support the projections.
  - Additional discussion has been included in Appendix C to describe the rationale for selection of the with project fleet.
  - Additional discussion has been included in Appendix C providing the depth at the principal foreign origin port for the slag traffic and indicating that it has sufficient depth to fully load the with project condition vessels to full channel depth.
  - Data on existing vessel characteristics have been included in Appendix C.
  - The with project condition vessels have been changed in the models and are described in Appendix C.

- Crude Oil Benefits
  - Historic tonnage has been presented in Appendix C, including a discussion of PIERS data problems. Reasons for recent declines have been discussed as well as the likelihood for recovery.
  - A discussion of the cost based approach to calculating reduced lightering benefits has been included in Appendix C.
  - Discussions of the price based approach have been modified and it has been clarified that this approach is only used to evaluate the reasonableness of refineries investing the associated costs necessary to achieve project benefits, and in sensitivity analyses. The price based approach has been changed to use a "representative rate" of $0.37/bbl, rather than the $0.35/bbl used in previous analyses. This change was made based on Maritrans' response to the interview notes that was received after the September 2002 report.
  - A discussion of the weighted average lightering rates (with and without) used in the benefit analysis has been included in Appendix C and the relevant tables revised.
  - The discussion of tide delay benefits has been expanded in Appendix.
  - Text has been added to Appendix C that describes the method used to interpolate between at port and at sea costs for with and without project conditions, and that these are adjusted on an annual basis.
  - Text has been added to Appendix C that describes whether additional lightering vessel(s) need to be added sometime during evaluation period to handle future tonnage growth.

- Delaware Terminals
    - Text has been added to Appendix C that describes the rationale for selection of the growth rate used for petroleum products.
- Pre-base Year Benefits
    - An expanded discussion of the rationale for pre-base year benefits has been included in Appendix C and the main report, and the amount of pre-base year benefits shown in the text.
- Sensitivity Analyses: A number of new sensitivity analyses have been performed and are included in Appendix C and summarized in the Main Report. In addition, most of the old sensitivity analyses on lightering prices have been removed, and the remaining ones modified. The sensitivity analyses included in this report have been reviewed for accuracy of calculation and completeness (i.e., whether they address all potentially important areas of uncertainty and are responsive to concerns raised by HQUSACE and the EITR team). The probability of these alternative scenarios has not been quantified, but qualitative statements have been added in instances where the analyst believed there was adequate information to assess the potential likelihood of some of the scenarios. These qualitative assessments have been reviewed and appear reasonable, but whether they are deemed correct must be left to the judgment of the reader. The revised sensitivity analyses that have been verified include:
    - Commodity growth rates
        - Crude Oil: 0% growth; growth at the base case rate, but only to the year benefits first accrue (2008); 0.7% growth; and negative of base case growth (i.e., since base case is +0.2%, negative of base case is –0.2%).
        - Delaware Terminal: 0% growth and negative of base case growth (–0.2%); growth at the base case rate, but only to the year benefits first accrue (2008); and U.S. DOE petroleum product growth estimates (greater than base case).
        - Containerships: 0% growth, 75% and 125% of base case growth; growth at the base case rate, but only to the year benefits first accrue (2009).
        - Steel Slabs: 0% growth, 75% and 125% of base case growth; growth at the base case rate, but only to the year benefits first accrue (2009).
        - Blast Furnace Slag: 0% growth (369,450 tons), 700,000 tons by 2009, 1.3 million tons by 2009; growth at the base case rate, but only to the year benefits first accrue (2009).
    - Cost of lightering operations
        - Range of at-sea and at-port operating costs for the Maritrans fleet of lightering vessels.

- Unchanged Maritrans fleet costs under without and with project conditions (i.e., same 3 vessel fleet).
- Removal of Maritrans 300 instead of Integrity from the lightering fleet under with project conditions.
- Replacement of the Integrity with a smaller vessel from Maritrans Gulf fleet.

- Price of lightering operations charged by Maritrans
  - Representative price of $0.37/bbl under without and with project conditions.
  - Representative price of $0.37/bbl without project and $0.42/bbl with project.
- Capital cost of "Albatross" Class containerships
  - $52 million capital cost (cost of new P&O Nedlloyd vessel in the benefiting fleet).
- With-project condition bulker fleet design draft
  - Steel slabs: with project design draft two feet greater and two feet less than base case.
  - No steel slab fleet shift under with project condition.
  - Blast furnace slag: with project design draft two feet greater and two feet less than base case.
  - No blast furnace slag fleet shift under with project condition.
- The year in which benefits commence for the refineries that have indicated they will "wait and see" before they commit to berth improvements (Coastal Eagle Point and Phillips 66 (Tosco)).
  - Benefits commence in 2010 (rather than 2008) for Coastal and Tosco.
- An additional risk analysis on costs has been included in the Main Report (but not Appendix C) addressing the cost risks associated with the contingency factors used in the project cost estimate.

- Vulnerability of Benefits to Actions of Individual Decision makers
  - A subsection has been added to the Sensitivity Analysis section of Appendix C that qualitatively evaluates and discusses vulnerabilities for each of the benefiting commodity groups. The probability of these vulnerabilities has not been quantified, but qualitative statements have been added in instances where the analyst believed there was adequate information to assess the potential likelihood of some of the scenarios. These qualitative assessments have been reviewed and appear reasonable, but whether they are deemed correct must be left to the judgment of the reader.