

DOCUMENTATION OF REVIEW

**DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT
 COMPREHENSIVE ECONOMIC REANALYSIS REPORT
 AUGUST 2002**

**Preliminary CECW-PC Comments Furnished “e” mail on 26 August 2002.
 Electronic Response by CENAD & CENAP on 6 September 2002
 Final CECW-PC Comments Furnished on 6 September 2002.
 Electronic Response by CENAD & CENAP on 16 and 18 September 2002
 Comprehensive Economic Reanalysis Report (December 2002)
 CECW-PC Electronic Comments Furnished on 13 December 2002.
 CENAP response on 13 December 2002.
 CECEW-PC Analysis on 17 December 2002.**

1. PROJECT COSTS. The policy compliance review team is concerned that the economic costs of the proposed deepening project may be underestimated. These concerns are based on: a) Low contingency, PED, and S&A costs in light of cost risk; and b) Disposal area volume and facility costs. Specific comments and recommended actions to resolve these concerns are described below.

A. HQUSACE COMMENT. (6 September 2002). Cost Estimate Contingencies. All major features of the proposed contract have been properly included in the revised estimate. However, the contingency ratios, PED and S&A costs used in the report need to be re-examined so that the estimate would cover unknowns, uncertainties, and/or unanticipated conditions.

ER 1110-2-1302, page D-9 has provided the following contingency factor (%) which represents a reasonable guide for construction features of cost estimates as follow:

Type of Cost Estimate	>\$10M	<\$10M
Reconn/Feasibility	20%	25%
Project/Feature Design Memorandum	15%	20%
Plans and Specifications	10%	10%

(1) Based on the information provided in the report and discussions with the East Coast Regional Dredge Team Member, a recommendation is made for much higher contingency percentages. The following recommended contingencies would limit the cost risk to an acceptable degree of confidence.

Description	NAP(Used)	HQ(Recommended)
Hopper & Pipeline Dredging	7%	13%
*Mob & Demob	5%	10%

Dike Construction	10%	15%
Mob & Demob	5%	15%
Rock Excavation	25%	25%
Mob & Demob	10%	15%
Water Quality Monitoring	7%	10%

(2) The low contingency ratios used in the report may be justified by utilizing reliable dredging records for the same or similar type work performed by the same or at least a similar dredge and historical construction data. (Dredging records – ENG27, report of operations-hopper dredges, ENG Form 4267 for report of operation-pipeline dredges). Furthermore, the higher costs may occur due to environmental impacts, which need to be considered and documented in the cost estimate.

(3) Enclosed is a revised cost estimate by HQUSACE in supporting the contingency ratios for doing this type of work at the stage of the project. In conclusion, after thorough review and analysis of the estimate, the revised estimate, in the amount of \$218,264,782, may be considered as a reasonable and an accurate representation of the cost of this work. This would be an increase of almost \$10 million from the estimate of \$208,421,731 shown in the Cost Estimate on page A-3.

Response. (18 September 2002). District re-examined the proposed contingency ratios for each of the referenced categories. As a result of this review, we do not concur with the recommended contingencies. The reasons for our conclusion are summarized below.

Contingencies used in the current cost estimate are fair and reasonable for this stage of the planning process. For projects at the pre-construction stage, according to ER 1110-2-1302, page D-9 guidance, should have a contingency of around 10%. The current estimate includes a contingency amount of \$15,636,656 or 8.1% of the total initial construction cost.

The contingency ratios for the dredging portion of the project and water quality monitoring are based on vast historical data available from the current annual maintenance dredging of the Philadelphia to the Sea, Delaware River 40-foot, Federal project. The Philadelphia to the Sea Federal project was deepened to 40 feet in the 1940's and has since been maintained by the Philadelphia District to the depth of 40 feet. Maintenance dredging along with water quality monitoring is performed on a yearly basis. In addition, dredging unknowns such as dredged load factors and dredging efficiency percentages have been reduced to provide a more conservative estimate.

Disposal area costs and contingencies are based on available historical data for constructing Federal upland confined upland disposal areas including dike construction as part of the existing Federal Philadelphia to the Sea project.

Mobilization and Demobilization contingencies are fair and reasonable based on our previous experience with dredging contracts. The mobilization travel distances in the

hopper dredge estimate have been further increased over our normal travel distance to accommodate an increased availability of hopper dredges.

As a result of the above, we have determined that the contingency factors applied are supported by specific and substantial operating experience and practice. These factors are fair and reasonable and need not be changed for this project modification.

Analysis. (30 September 2002). The contingency estimates for the most part are based on historical data available from the current annual maintenance dredging. The response **resolves the concern.**

B. HQUSACE COMMENT. (6 September 2002). Disposal Areas Volume & Facility Costs. Informal responses from CENAP on disposal site availability indicated that the disposal capacity to be utilized at Raccoon Island (503.99 acres) and Site 15 D (436.52 acres) is 18.3 million cubic yards and the site capacities would be 22.5 million cubic yards for each site. The embankment quantities shown on page A-6 of the Cost Estimate are significantly different for these two sites. The quantities are 650,900 cubic yards for Raccoon Island and 272,500 cubic yards for Site 15 D. If the capacities of the sites of similar acreage are the same, why are the embankment quantities so much greater for one site? The review team is concerned, that the report did not contain any information on the site facilities sufficient to contain either the 18.3 million cubic yards of utilized capacity or the 22.5 million cubic yards of total capacity planned for each site. In order to determine the overall magnitude of facility needs the following calculations were made to determine a rough estimate of the height of the planned volume of dredged disposal material at each site. As a starting point note, that an acre equals 43,560 square feet. Next, the disposal material spread over just one acre at a height of 3-feet would contain 14,520 cubic yards. If all of the 503.99 acres of Raccoon Island were at a height of 3-feet, the site would contain 7.3 million cubic yards. The “e” mail stated that the utilized disposal is 18.3 million cubic yards. Even spreading of this quantity of material at Raccoon Island would require a height of 7.5 feet and the ultimate capacity of 22.2 million cubic yards would require a height of 9.2 feet. Moreover, the resulting heights at site 15 D would be even higher because of less acreage are available. A description and discussion of the costs of associated facilities and measures required to contain the scheduled quantities of dredged disposal material at each site is needed.

Response. (18 September 2002). Although the dike raising quantities for the two disposal areas may seem unbalanced, a closer look at the details clearly explains the difference in fill required to construct the areas. Historic and existing knowledge and experience provides greater accuracy than the geometric estimates presented in the comment.

The diked acreage at the two areas is as follows: Raccoon Island 350 acres, and 15D 320 acres. A comprehensive geotechnical analysis was completed as part of the Pre-construction Engineering and Design Study for the proposed new upland confined disposal areas including Raccoon Island and 15D for the Delaware River Main Channel Deepening Project. The results of this analysis, performed by Corps consultant,

Woodward-Clyde Associates with all pertinent backup, is contained in Appendix C of the Design Memorandum Report completed in 1996. The detailed geotechnical exploration and testing program consisted of 42 borings. Dike designs, following Corps of Engineers criteria were completed for the proposed upland confined disposal areas. Dike raising quantities were calculated using current topographic maps and proposed construction templates.

The configuration, existing elevations, and differences in linear feet of perimeter diking, explains the difference in diking quantity. The total linear feet of perimeter dike at Raccoon Island is 20,260 feet and at 15D 17,100 feet, a difference of over 3,000 feet. The main reason for this is the requirement to build two cross dikes through Raccoon Island the area to maintain an existing high-tension line utility corridor. In addition, an abandoned state road through the area requires 24 foot high dikes over 600 feet in length to close off facility. The average required dike height to be constructed at Raccoon Island is 13 to 14 feet, while at area 15D it is less than 10 feet. In fact, over 6,000 linear feet of dike at area 15D is less than 5 feet in height due to existing ground elevations. This is due to past disposal operation, which built up one half of the area with heavier granular material. Foundation conditions are also inferior at area 15D, requiring the use of wick drains to construct the dikes to their proposed height. This condition effectively limits the ability to build the initial dikes any higher than already proposed.

The embankment quantities shown on page A-6 of the Cost Estimate Appendix are the amount required to perform the initial disposal area construction. On site material is utilized to construct the dikes, resulting in low per cubic yard unit price. The unit price includes excavation placement and shaping of disposal dikes. The costs are based from decades of government-funded operation and maintenance of the existing Federal upland disposal areas that are utilized for placement of dredged material from the Delaware River 40-foot navigation channel.

Once the dikes are constructed, ten to thirteen feet of freeboard will be created in each of the new upland disposal areas. This is enough capacity to handle the scheduled amount of dredging from the initial deepening of the channel. (i.e. 3.2 million cubic yards (mcy) to Raccoon, 1.6mcy to 15G, and 2.1 mcy to 15D). There is additional disposal capacity remaining at these sites after the initial dredging which will be utilized in the operation and maintenance phase of the project. For the subsequent 50-year project maintenance, dikes will be raised 3 times at each of the disposal areas accounting for the stated ultimate disposal capacities. The costs for future dike raisings at each of the proposed sites have been estimated and included as part of the 50-year project operation and maintenance cost. The design and cost for constructing the disposal areas and subsequent dike raisings are in the general design memorandum level, allowing for preparation of construction plans and specifications.

Analysis. (30 September 2002). The embankment quantities shown on page A-6 of the Cost Estimate Appendix are the amount required to perform the initial disposal area construction. On site material is utilized to construct the dikes, resulting in low per

cubic yard unit price. The costs and quantities are also based upon the current annual maintenance dredging. The response **resolves the concern.**

C. HQUSACE COMMENT (26 August 2002). Disposal Sites This issue needs to be addressed in the report and cost estimates. It was mentioned in the GAO report (reference page 16 of final report). A July 16, 2002 letter from the County of Gloucester, New Jersey was sent to the Commander Philadelphia District. A copy of this letter was sent to the Comptroller General of the GAO and furnished to HQUSACE by GAO. The letter pointed out that, the County of Gloucester and Logan Township have a longstanding partnership to develop a riverfront park adjacent to the Delaware River. Two land parcels are identified as disposal areas for the project's dredged materials. These sites are 15-D and Raccoon Island. It is anticipated that land acquisitions would be completed by late August 2002.

GAO had expressed concern that these sites may not be available and the feasibility of the Delaware River Deepening could be affected. On page 16 of the subject GAO report the cost of these sites was stated at \$15.4 million. The footnote to this figure stated that, "This figure was cited in the 1998 Reevaluation Report; it is presented in 1996 dollar values. Page B-2 of the Comprehensive Economic Reanalysis Report shows the cost of site 15D at \$2,727,000 and Raccoon Island at \$3,165,000. Did GAO use an incorrect value from the 1998 Limited Reevaluation Report? Since 1996 time frame one would have expected doubling or threefold increase in real estate prices and not a one-third reduction.

Accordingly, please answer the following questions:

(1) Comment. (26 August 2002). In the GAO Report on this project, the cost for purchasing the three disposal sites is estimated to be \$15.4 million. Can you determine the basis for this figure?

Response. (6 September 2002). The LRR in 1998 provided a total real estate cost estimate of \$18,598,000 for four sites to be purchased in fee. The estimate in the LRR was not broken down by site. GAO requested, during their investigation, a breakout of the costs for site 17G, since the site is no longer planned for use by the project. A figure of \$3,159,391 was provided by the project's Realty Specialist to CENAP by email on 5 March 2002. This figure must have been forwarded to GAO. If that number is taken from \$18,598,000, \$15,428,609 results which is GAO's figure. The GAO figure is therefore explained; nevertheless, GAO's footnote is misleading.

Analysis. (6 September 2002). The response provided requested background on the basis for the GAO cost estimate. The concern **is resolved.**

(2) Comment. (26 August 2002). The 1996, 1998 and 2002 Reports all differ with respect to total Real Estate costs, which actually decline from \$21,637,523 in 96 to \$18,598,000 in 98 to \$10,057,000 in 02. Please explain the decline in costs.

Response. (6 September 2002). The decline in costs can be explained by a review of the gross appraisals and Real Estate Plans completed for this project for each of the reports identified in the question. The attached chart summarizes the real estate characteristics and costs estimated for each report to aid comparison and understanding.

To support the 1996 Design Memorandum, a 25 April 1996 addendum to a gross appraisal completed on 1 July 1995 studied four designated sites including sites 15G, 15D, Raccoon Island and 17G, totaling 1,753 acres of land. The final estimate of value totaled \$20,427,290. The total real estate costs, including administrative items and contingencies was estimated at \$21,637,523.

To calculate a value for the real estate payments in the Real Estate Plan completed to support the 1998 Limited Reevaluation Report, the 1996 real estate values for each site by acre were multiplied by updated acreage amounts. The sites remained the same as in the Design Memorandum; however, the acreage decreased to a total of 1,537 acres. The major change resulted from new calculations of lands subject to navigational servitude at site 17G. As a result land payments were estimated at \$17,532,596 and total real estate costs with contingencies and administrative items were estimated at \$18, 598,000.

To support the 2002 Comprehensive Economic Reanalysis Report, a gross appraisal completed as of 4 June 2002 involved just three designated sites, including sites 15G, 15D and Raccoon Island with a total acreage of 1,295.16. The final value estimate of \$8,102,000 involved only the value of the fee interest in the land of these three sites. An estimate for acquisition costs for the Broadkill Beach Placement Site was performed separately in July 2002 and estimated a value of about \$153,390 associated with the temporary easements required for this part of the project. Total acreage for all lands, fee and temporary area work easements, totaled 1,320 acres.

The value declines experienced from 1996 to 2002 are due to three basic factors:

- (a) A decrease in the acreage involved.
- (b) A change in estimation of the Highest and Best Use (H&BU) of the subject land from that originally concluded in the supporting 1995 gross appraisal report. This change primarily focused on the Raccoon Island site causing a significant reduction in value. Actions within the subject's market during the intervening years did not support the assumptions upon which the H&BU of the 1995 appraisal was made. This change required different adjustments to be made to comparable sales as well as the type of comparable sales to be used.
- (c) The quality of the comparable sales used in the appraisal reached a highpoint during the 2002 appraisal. Real estate markets and activity are fluid over time. The very best and by far most comparable sales available to the

appraiser occurred immediately prior to the completion of the 2002 gross appraisal. Two sales of land were identified containing very similar amounts of acreage and land conditions, and both were situated contiguously to site 15D. Both sales occurred within six months or less of the appraisal. Both sales were arms length involving normal market conditions of sale.

Analysis. (6 September 2002). The decline in costs was explained by the above description of the review of the gross appraisals and Real Estate Plans completed for this project. The concern **is resolved.**

(3) Comment (26 August 2002). Please provide all of the real estate information needed on a per site basis for Raccoon Island, Site 15D and Site15G. What is the relationship between our estimated fair market value and the assessed value?

Response. (6 September 2002). Please refer to the attached chart for specific site information.

Site 15G: The parcels are zoned Agriculture-Residential (Oldmans Township, Salem County). Assessed values per acre are \$6,242 for lot 2, \$770 for lot 5, and \$8,224 for lot 6. The last re-assessment in this township occurred in 1991.

Site 15D: The parcels are zoned VR-A, Village Residential (Logan Township, Gloucester County) a special management overlay district. There are 53 lots contained in this site. Assessed values range from \$500 to \$3,000 per acre with 39 of the lots having assessed values of between \$1,000 and \$1214 per acre.

Raccoon Island: The parcels are zoned MC, Marine Commercial Residential (Logan Township, Gloucester County) which limits uses to marinas, boat storage and repair, boat sales and other similar service establishments. The two lots have assessed values of \$5,733 and \$5,439 per acre.

The last re-assessment for property in Logan Township occurred in the early to mid 1990s.

The value per acre concluded in the appraisal is \$5,700 and with a 10% contingency rounded to \$6,300. The value was based upon two very recent sales of acreage involving a number of parcels situated contiguously with site 15D and lying between Rt. 130 and the Delaware River. Zoning for one sale is MC, Marine Commercial and for the second sale, River Front Industrial. Assessed values for the parcels making up these two sales are in line with the assessed values of the parcels contained in site 15D. In addition, the appraised per acre value is also strongly supported by an earlier sale of acreage lying between Rt. 130 and the Delaware River in Oldmans Township, Salem County opposite site 15G. The zoning for this comparable sale was I, Industrial with the assessed value being in line with those applicable to the parcels comprising site 15G. In all cases, assessed values were lower than the arms length sales prices for each of the comparable sales.

USACE, Baltimore District, Real Estate Division

DELAWARE MAIN CHANNEL DEEPENING
Real Estate Plan and Gross Appraisal Comparison

Report	Design Memorandum	Limited Reevaluation Report	Comprehensive Economic Reanalysis Report	Overall Differences
Date of Report	May-96	Feb-98	Aug-02	
Site Acreage				
15G	352	352	355	
15D	437	437	437	
17G	440	224	Not Applicable	
Raccoon Island	524	524	504	
Broadkill Beach Placement	Not Applicable	Not Applicable	25	
Total Acreage:	1753	1537	1320	433
Gross Appraisal by Site				
15G	\$ 2,111,220	\$ 2,110,920	\$ 2,200,000	
15D	\$ 3,059,000	\$ 3,059,000	\$ 2,737,000	
17G	\$ 5,896,000	\$ 3,001,600	Not Applicable	
Raccoon Island	\$ 9,361,070	\$ 9,361,076	\$ 3,165,000	
Broadkill Beach Placement	Not Applicable	Not Applicable	\$ 153,390	
Total Estimate:	\$ 20,427,290	\$ 17,532,596	\$ 8,255,390	\$ 12,171,900
Gross Appraisal by Acre by Site				
15G	\$ 6,001	\$ 6,000	\$ 6,203	
15D	\$ 7,000	\$ 7,000	\$ 6,270	
17G	\$ 13,400	\$ 13,400	Not Applicable	
Raccoon Island	\$ 17,850	\$ 17,850	\$ 6,280	
Broadkill Beach Placement	Not Applicable	Not Applicable	\$ 6,188	
Total Admin. & Other Costs	\$ 1,210,233	\$ 1,065,405	\$ 2,447,610	\$ (1,237,377) *
REP Total Value	\$ 21,637,523	\$ 18,598,000	\$ 10,703,000	\$ 10,934,523
Estate Recommended	Channel Improvement Easement and Fee	Fee	Fee & TWAE	

* 2002 Administrative and Other Costs includes a significant factor (about \$975,000) for risk.

Analysis. (6 September 2002). The real estate information needed on a per site basis for Raccoon Island, Site 15D and Site 15G was provided. Also the relationship between the estimated fair market value and the assessed value was described. The concern **is resolved.**

(4) Comment. (26 August 2002). Has the Gloucester County Improvement Authority acquired any portions of Raccoon Island and Site 15D for recreation purposes? If so, what was the acquisition price? If not, do we know what they want to acquire - acreage and location?

Response. (6 September 2002). Gloucester County has been trying to acquire these two sites over several years. It is our understanding that Gloucester County lacks the funds to acquire land and develop a park. At this point, we have no knowledge that these sites will be acquired by end of August, or ever, for that matter. A review of the local land records available electronically, conducted last week, for data dated 17 July 2002, showed that no property to be acquired for the project had changed ownership since that REP was completed. No lands have yet to be acquired by the county. The sponsor, the DRPA, has also looked into this, and has found no basis to substantiate the claims in the County's letter. As noted previously, Logan Township already owns eight of the 53 total lots that comprise site 15D. The potential for condemnation of at least parts of the sites has been anticipated in the Real Estate Plan and an associated cost and risk factor has been estimated.

Analysis. (6 September 2002). The property to be acquired for the project has not changed ownership since that REP was completed. Also the potential costs of condemnation have been considered in the Real Estate Plan. The concern **is resolved.**

(5) Comment. (26 August 2002). Since the Sponsor can condemn in New Jersey and Pennsylvania, what is the basis for the Sponsor requesting the Government to do so?

Response. (6 September 2002). The Sponsor cannot condemn real estate interests in Delaware where the beach placement site is located.

Analysis. (6 September 2002). The concern **is resolved.**

(6) Comment. (26 August 2000). If we do not have a willing seller for Raccoon Island and site 15D and we do not want to condemn, how difficult will it be to find alternative sites? The 2002 REP indicates that the current updated gross appraisal for project lands reflects an average price per acre, with a ten-percent contingency, of \$6,300. Is this a reasonable cost per acre to assume for an alternative site that might be acquired for dredge material disposal?

Response. (6 September 2002). A potential alternate site is Whites Basin that is located adjacent to the Raccoon Island site. Additionally, other lands also within the immediate vicinity of the currently identified sites may be available. The 2002 REP indicates an estimated land payment average price per acre of about \$6,300. The REP also included a risk factor of about \$975,000 or about \$740 per acre. CENAB-RE feels that it is reasonable to assume at this time, based on the information on hand, that an alternative site could be acquired for about \$6,300-\$7,040 per acre. This includes real estate land payment costs only for comparable property located with the subject's vicinity. If White's Basin were to be acquired however, the value may be increased to account for additional remuneration due the landowner for the loss of benefit derived from the leasehold agreement with Weeks Marine. In addition, this particular parcel is currently being actively used as a dredged material deposit site involving the ongoing engineering and construction of dikes and drainage systems, which add value to the pure land value. Balancing this increased cost is the potential savings that could be recognized in the project costs of engineering and construction of such infrastructure. Engineering, environmental and construction investigations would need to be performed on any alternative sites identified.

Analysis. (6 September 2002). Nearby sites are available at a comparable cost to sites Raccoon Island and 15 D. The concern **is resolved.**

(7) Comment. (26 August 2002). The Sponsor has previously requested credit for costs of investigations and studies supporting a prudent acquisition decision. Although the PCA has not been executed, have any of these engineering and environmental costs been captured in the REP for the disposal sites?

Response. (6 September 2002). The CENAB-RE employees currently working on the project are not aware of specific "investigations or studies" supporting a prudent acquisition decision, for which the Sponsor has requested credit. Normal costs related to acquisition activities have been estimated in the REP, including costs for title work, surveys, appraisals, negotiations and condemnations. No costs for other, extraordinary investigations or studies have been factored into the REP. We have conducted our estimate based on the assumption from CENAP that no known hazardous or toxic wastes exist within or adjacent to the sites selected, and, therefore, other environmental studies to support acquisition studies would not be warranted or planned at this time.

Analysis. (6 September 2002). CENAP indicates that no known hazardous or toxic wastes exist within or adjacent to the sites selected, and, therefore, other environmental studies to support acquisition studies would not be warranted. The concern **is resolved.**

(8) Comment. (26 August 2002). Will the Gloucester county acquisition schedule be completed before the Delaware Port Authority can acquire a permanent easement?

Response. (6 September 2002). Refer to response to item 1.d. above. A fee purchase of the additional disposal areas needed for the project has been recommended in accordance with our policies and regulations, not a permanent easement.

Analysis. (6 September 2002). The property to be acquired for the project has not changed ownership since that REP was completed. Also the potential costs of condemnation have been considered in the Real Estate Plan. The concern **is resolved.**

(9) Comment. (26 August 2002). What is the potential impact on the disposal land costs on the Delaware River Deepening Project if alternative sites are needed?

Response. (6 September 2002). Please refer to the response to 1.f. Potential impacts on the disposal land costs are thought to be minimal. Total economic impacts would depend on the location and physical characteristics of the alternate sites, studied from engineering, environmental, construction and real estate perspectives.

Analysis. (6 September 2002). Nearby sites are available at a comparable cost to sites Raccoon Island and 15 D. The concern **is resolved.**

(10) Comment. (26 August 2002). How many cubic yards of dredged material were scheduled to utilize these sites in the current reanalysis?

Response. (6 September 2002). About 36.6 million cubic yards are scheduled to be utilized at Raccoon Island and 15 D.

Analysis. (6 September 2002). The response **has resolved the concern.**

(11) Comment. (26 August 2002) What is the comparative distance to alternative sites?

Response. (6 September 2002). A potential alternate site is White's Basin that is adjacent to Raccoon Island and 1.5 miles upstream of area 15D. Additionally other lands also within the immediate vicinity of the currently identified sites may be available.

Analysis. (6 September 2002). The response indicated that alternative sites are available. The concern **is resolved.**

(12) Comment. (26 August 2002). What is the expected cost per cubic yard at alternative sites?

Response. (6 September 2002). A unit cost can be calculated for the alternate sites in terms of transportation costs, engineering costs, construction costs and real estate costs. If an alternative site would be used such as White's Basin, the estimated unit cost, considering these terms, would probably compare favorably to the current estimated unit costs.

Analysis. (6 September 2002). The unit costs at alternative nearby potential sites are comparable. The concern **is resolved**.

(13) Comment. (26 August 2002). Is there sufficient capacity for both the initial dredged material and O&M requirements if these sites are not available?

Response. (6 September 2002). An alternative site, such as White's Basin, along with site 15G, would provide adequate capacity to accept initial and new incremental O&M dredging quantities for the entire 50- year project.

Analysis. (6 September 2002). The response indicated that the alternative sites have sufficient capacity. The concern **is resolved**.

D. HQUSACE COMMENT. (26 August 2002). Long Term Operations & Maintenance Costs & Site Tradeoffs. Page B-2 also states that, "By the purchase of the three upland disposal sites, the NFS will be providing an equivalent amount of disposal capacity to the Federal Government that will offset the loss of disposal capacity at the existing Federal sites." Although these sites may provide equivalent volume capacity, the distance from the dredging site may be greater than from the currently used Federal site that will lose capacity. The cost implication of the site tradeoff needs to be made explicit.

Response. (6 September 2002). The acquisition of the three new sites will provide an equivalent amount of disposal capacity to the federal government, offsetting the loss of capacity at existing sites. In some instances the distance to the new sites will be greater than the existing distance, and in some cases it will be less. More importantly the new sites do not provide replacement capacity to all reaches of the river, but are centrally located in the area of the highest historical shoaling in the river. This is a benefit to the government that far offsets the instances of increased pumping distance. We have excess capacity in reaches C and D, where the existing disposal areas can handle the incremental quantities and still retain capacity after 50 years. If the sponsor only provided enough capacity in reach B to offset the incremental quantities from the deepening, the government would not have 50 years of capacity in this reach, however since we are "trading off" the excess capacity from reaches C and D, the disposal plan is practical and provides 50 years of capacity.

Analysis. (6 September 2002). The sponsor sites are centrally located in the area of the highest historical shoaling in the river. The government has excess capacity in reaches C and D, where the existing disposal areas can handle the incremental quantities and still retain capacity after 50 years. The government needs to have 50 years of capacity in this reach, and by "trading off" the excess capacity from reaches C and D, the disposal plan is practical and provides 50 years of capacity. The concern **is resolved**.

E. HQUSACE COMMENT. (26 August 2002). Channel Deepening & Potential Greater Shoaling in Terminal Access Channels. Reference is made to page 66 of Appendix C Benefits Analysis. "Motiva officials have expressed their opposition to the project based on concerns that existing shoaling problems in their access channels

could be exacerbated by deepening the Delaware River main channel.” The report needs to discuss the potential for increased shoaling in the access channels of terminals adjacent to the proposed deepened channel. If shoaling is increased these with project costs need to be recognized.

Response. (6 September 2002). Motiva has gone on record with the above concern regarding potential impacts of the Delaware River Channel Deepening on their shoaling problem. The Motiva assertion is based on a report written by COASTWATCH ENGINEERING AND PLANNING, BALTIMORE, MD, for Motiva. Coastwatch performed a 2D numerical flow modeling effort for a limited portion of the Delaware estuary in the vicinity of the refinery. The report was first provided to the Philadelphia District three days before the public meeting (November 2001) at which Motiva first made the assertion regarding shoaling impacts. Since that time, the District has performed a more extensive review of the Coastwatch report, and has obtained review comments on the report from the Corps Engineering Research Development Center (ERDC-HL (Mr. Allen Teeter)).

It is the view of the Philadelphia District, which is supporter by the ERDC review, that the Coastwatch/Motiva statements regarding potential shoaling increases are not credible. There are several errors and apparent misconceptions in the Coastwatch report that suggest a lack of understanding of the hydraulic and sedimentation regimes of the estuary in the vicinity of the Motiva refinery and access channel. Coastwatch also misquoted 3D numerical model results from the report prepared by the Philadelphia District and ERDC on the salinity/hydrodynamic modeling for the Deepening project.

It is the position of the Philadelphia District that the Motiva claims are unfounded, and that the proposed deepening of the Delaware River Main Channel will have no perceptible effect on the sedimentation problems presently experienced by Motiva.

Analysis. (6 September 2002). The District has performed a review of the Coastwatch report, and has obtained review comments on the report from the Corps Engineering Research Development Center (ERDC). The ERDC review determined that the Coastwatch/Motiva statements regarding potential shoaling increases are not credible. The response **has resolved the concern.**

2. BENEFIT ANALYSIS. The policy compliance review team comments on the benefit analysis are outlined below by commodity group. There are concerns that the economic benefits of the proposed deepening project may be overstated. These concerns are based on key assumptions regarding: a) Conversion factors on petroleum imports; b) Growth rates for steel; c) Vessel drafts; d) Representative ships; e) Containership capacity; f) Draft & tonnage; and g) Refrigerated cargo capacity. Specific comments and recommended actions to resolve them are described below.

ALL BENEFITING COMMODITIES

A. HQUSACE COMMENT. (26 August 2002). Freshwater Sinkage. During the interview of Capt Linton of Delaware Pilot's Assoc on 6/22 he noted, that all drafts are freshwater drafts. The allowance for fresh water is 1/4 an inch per foot of summer draft. For example, the P&O Ned Lloyd container ships are projected to have a draft of 41-feet when loaded with frozen poultry and frozen vegetables (Ref page C-39). The fresh water allowance for a 41-foot ship would be: $(41 * .25 = 10.25)$ inches or nearly one foot. However, the ships cannot load as much cargo in fresh water and more vessel transits are needed. There are about 2% more transits eligible for cost reduction benefits due to higher load factors from a with project deeper channel. If a fresh water port is either the origin or destination about one foot of cargo cannot be loaded. If oil tanker vessels lighter offshore in salt water, the freshwater at the origin would limit the cargo volume. If the mother ship proceeds to Philadelphia, it has to account for fresh water draft and cargo volume. It is not clear if the Delaware River lightering area at Big Stone light is in fresh or salt water. If there is fresh water the cargo volume and draft requirements match the Philadelphia terminal. If this area were salt or brackish water, the cargo volume and drafts would be controlled by the Philadelphia unloading terminal.

However, the fresh water sinkage requires more dredging in the fresh water zone as compared to the salt-water zone because the vessel is not as close to bottom in the denser salt-water zone. The costs for the berths and inner harbor dredging must take into account the need to remove more dredged material because the ship will sink further into the water in the fresh water.

Regarding container vessels with a Savannah Harbor as last port of call. Savannah remains salt to brackish water for a significant portion of the harbor such that ships never get to fresh water. Also, due to climate Savannah does not have much seasonal (summer vs. winter) draft change. Actual sailing drafts are used to determine operating conditions. And there is not a factor in Savannah for freshwater sinkage. The following concerns for the commerce that has either a Philadelphia origin or destination should be addressed:

(1) Comment. (26 August 2002). Was fresh water sinkage taken into account for the loading volumes and sailing drafts for container ships in the Delaware River?

Response. (6 September 2002). No. All vessel sailing drafts used in the analysis were actual drafts taken from the WCSC and Maritime Exchange databases. Based on Captain Linton's interview, these can be assumed to be fresh water drafts.

Analysis. (6 September 2002). The response **has resolved the concern.**

(2) Comment. (26 August 2002). Was the fresh water sinkage taken into account at the Big Stone lightering point and the Delaware River destination dock for vessel unloading and required sailing drafts?

Response. (6 September 2002). No. Since both the anchorage and docks are freshwater, and all sailing drafts were observed drafts from the databases, no fresh water versus salt-water sinkage allowance was necessary.

Analysis. (6 September 2002). The response **has resolved the concern.**

(3) Comment. (26 August 2002). Is the fresh water sinkage taken into account for the steel and slag imports vessel drafts and cargo loadings?

Response. (6 September 2002). Sailing drafts for tanker and bulk vessels were calculated by multiplying the tonnage loaded by the immersion rates listed in EGM 00-06. It is assumed that these immersion rates are salt water rates. Using fresh water immersion rates in the calculations would result in tankers lightering less tonnage at anchorage and bulkers carrying less tonnage per call under both the with and without project future conditions. Using fresh water immersion rates in place of salt-water immersion rates would tend to slightly decrease project benefits. Although, precise fresh water immersion rates are not immediately available for the vessels used in this analysis, a conversion factor of .079 (fresh water immersion rate = salt water immersion rate * .079) can be calculated from the relation identified in the comment above (1/4 inch per foot). Adjusting the immersion rates used in the analysis by the conversion factor identified above decreases total project AAEQ benefits for Sun by approximately \$225,000 or .0895%. If appropriate salt water to fresh water immersion rate conversion factor can be identified, benefits can be recalculated to reflect the fresh water allowance.

Analysis. (6 September 2002). The benefits were recalculated to reflect the freshwater allowance. The response **has resolved the concern.**

(4) Comment. (26 August 2002). Do any of the oil, steel, slag & containership origin ports or last ports of call load in fresh water?

Response. (6 September 2002). Most of the origin ports and last ports of call appear to be salt-water ports, however, the impact of salt-water origin ports and last ports of call for oil, steel, and slag was demonstrated in the response to the previous comment. Containership benefits were based upon the routing options for the entire service and were not based upon the loading of individual vessels.

Analysis. (6 September 2002). The response **has resolved the concern.**

(5) Comment. (26 August 2002). If Charleston were the P&O Ned Lloyd last port of call for the service from Australia to Philadelphia would the loading and ship drafts require a fresh water allowance?

Response. (6 September 2002). All vessel sailing drafts used in the analysis are fresh water drafts, so an additional fresh water allowance is not required. Presumably, the vessels currently using these routes are loading with the knowledge that Philadelphia requires a fresh water allowance.

Analysis. (6 September 2002). The response **has resolved the concern.**

B. HQUSACE COMMENT. Benefit Model Assumptions.

(1) Comment. (26 August 2002). The D Growth factor in the spreadsheets increases the draft of the vessels in the future to allocate tonnage growth. This provides an assumption of all ship drafts increasing to the maximum allowed by the channel. Justification is needed as to why the existing proportion of inefficient light loading was not carried into the future.

Response. (6 September 2002). The existing proportion of light loading was carried into the future. For example, the tanker Arcadia has a design draft of 42 feet but arrived twice at Valero in 2000 loaded to 38 and 39 feet sailing draft. In the future without project condition this vessel is assumed loaded to a maximum of 39 feet, which is its maximum observed sailing draft. Similarly, in the with project condition, vessels are assumed to be loaded in the same proportions as they are in the without project condition.

The maximum sailing draft in the with project condition (45-foot channel) was set for Valero at 44 feet which reflects the average observed sailing draft of 39 feet in the existing 40-foot channel (for vessels with design drafts greater than 40 feet).

Analysis. (6 September 2002). The response pointed out, that the with project condition, vessels are assumed to be loaded in the same proportions as they are in the without project condition.
The concern **is resolved.**

(2) Comment. (26 August 2002). Explain how nearly \$1 million in benefits were allocated to combo vessels.

Response. (6 September 2002). Combination vessel benefits are calculated in the “Summary data” spreadsheet. Benefits related to tonnage carried on combination vessels in the 2000 database are calculated separately for two reasons, 1) these vessels are former bulk carriers that have been refitted for crude transport, so it is unclear how to calculate the daily at sea and in port vessel costs, and 2) combination vessels are being phased out of service are not expected to be part of the fleet calling at the Delaware River after 2008. The total crude oil tonnage delivered to each facility on combination vessels, based on Maritime exchange and WCSC data, is multiplied by the average savings per ton for that facility in order to allocate with project cost savings to tonnage carried on combination vessels in the 2000 database.

Analysis. (6 September 2002). These vessels are being used to transport crude in data year 200 but will be phased out by the time the project is completed in 2008. The crude oil tonnage previously carried on these former bulk vessels will be carried on tankers at the time period that project benefits are tabulated. The concern **is resolved.**

(3) Comment. (26 August 2002). Why would the incomplete records tonnage be applicable to both lightered and direct shipment tonnage? The direct tonnage would only have one transportation leg and would be less likely to be lost in incomplete records. It is noted that the direct shipments have the highest savings per ton and a misallocation to direct shipments would overstate benefits.

Response. (6 September 2002). The number of incomplete records comes directly from the database. Although it may appear that direct tonnage would be less likely to contain incomplete records, no such assumption was made, as the information comes directly from the 2000 database and does identify the receiving dock/refinery.

Analysis. (6 September 2002). Since the 2000 database and does identify the receiving dock/refinery the concern on the potential misallocation to direct shipments is resolved.

(4) Comment. (26 August 2002). Since time from tide delay and vessel transit time due to lightering is saved explain if these savings can be utilized in light of current practice of waiting at anchorage for a berth. Time savings cannot be used if the ship is used for floating storage.

Response. (6 September 2002). Time savings, as calculated in this analysis, include only time associated with the act of lightering (maneuvering within the anchorage and setting the anchor, hooking up and breaking down lightering equipment, and transferring oil) and time spent waiting to proceed from the anchorage (tide delay). Any “excess time” spent at anchorage over and above what is spent for these purposes was assumed to be the same under with and without project conditions and was not included in the time savings calculations.

Analysis. (6 September 2002). The time savings include only time associated with the act of lightering and time spent waiting to proceed from the anchorage (tide delay). The concern is resolved.

OIL TRAFFIC & BENEFITS.

A. HQUSACE COMMENT. (6 September 2002). Conversion Factor Barrels Per Metric Ton. The current petroleum tonnage may be overstated by 11%. There was a problem with the 2000 waterborne commerce database. PIERS had used a dense conversion factor of barrels per metric ton of 6.37 when the country by county range should have been 6.4 to 8.14 barrels per metric ton. The Waterborne Commerce Center has made the required adjustments in their database. The revised database has been sent by New Orleans Waterborne Commerce Center to the Philadelphia District and also to David Miller Associates. A DMA input data sheet for Petroleum shows the conversion rate of barrels per ton as 7.35. Is DMA using the same conversion factors as the Waterborne Commerce Center?

Response. (16 September 2002). Yes, the Philadelphia District is using the same conversion factors as WCSC. The 7.35 bbl/ton conversion rate cited in the comment was used only in preliminary versions of the spreadsheet models. The analytical models that accompanied the August 12, 2002 report submitted to HQUSACE used country specific conversion rates obtained from DOE at www.eia.doe.gov. The country specific conversion rates used in the analysis are shown in the “Consolidated for Report” Excel workbook on the worksheet entitled “Barrel Conversion Rates”.

We have confirmed with the Waterborne Commerce Statistics Center (WCSC) that these are the same rates that were used by WCSC in their revisions to the Year 2000 crude oil commodity import tonnages provided by WCSC to the Philadelphia District on September 5, 2002. The Philadelphia District is currently inputting the revised tonnages into our crude oil transportation cost models, and has also elicited the support of the Delaware River Port Authority to verify the revised Waterborne Commerce Tonnages through direct contact with each refinery.

Analysis. (30 September 2002). DMA has confirmed with the Waterborne Commerce Statistics Center (WCSC) that these are the same rates that were used by WCSC in their revisions to the Year 2000 crude oil commodity import tonnages provided by WCSC to the Philadelphia District on September 5, 2002. The response **resolves the concern.**

B. HQUSACE COMMENT. (26 August 2002). Barrels Of Oil Per Metric Ton. The use of general conversion factor may be one of the factors that resulted in the unallocated tonnage. The report used a ratio of 7.353 barrels per metric tonne. This ratio would be appropriate for a general average or for crude coming from Nigeria. However, the crude coming from South America is much heavier. For example, the ratio for Venezuela was 7.005. In any event, the use of the ratio of 7.353 for the South America origins understates the tonnages if the lighter crude ratio is used as the basis for the tonnage volume. Also clarify the proper conversion for the tonnage measurement (metric tones and short tons) was utilized in the calculations. To derive the correct number for each company, request information on both the tons and barrels of crude oil received at their docks. The electronic source for the ratio (7.353 metric tons) used in the report is:

<http://www.nepo.go.th/ref/UNIT-OIL.html>

Response. (6 September 2002). This comment was received on an early draft of the analysis. Therefore, the final benefit analysis presented in the August 12, 2002 submittal did incorporate individual country conversion rates (barrels to metric tons) to calculate the time required for lightering and off loading at the dock.

Analysis. (6 September 2002). The concern is **resolved, since** the final benefit analysis presented in the August 12, 2002 submittal did incorporate individual country conversion rates.

C. HQUSACE COMMENT. (26 August 2002). Tidal Delay Savings Calculation. Reference is made to a statement from Section 3.5.1 of the Benefits Analysis Appendix C page C-25. "Typically, vessel traffic on the main channel Delaware River is two-way. However, when VLCCs are brought upriver to a Delaware River refinery, the enormous size (particularly beam) and limited maneuverability of these vessels requires one-way operation of the channel in their vicinity. These vessels also come upriver only during daylight hours." It is not clear if this restriction applies to just the Stena class very large crude carriers or does the restriction also apply to the Suezmax vessels. If it's Both classes, that is yet another reason for very large vessels to wait at anchorage longer than the lightering process requires. The tidal delay savings calculation need to consider a clear with and without project time savings that takes into account the non-tidal operating restrictions that interfere with the use of the tide cycles.

Response. (6 September 2002). The travel restriction only applies to the Stena Class vessels, not all of the Suezmax tankers, because of the navigation requirements posed by the unique design characteristics of the Stena's (shallower, wider).

Analysis. (6 September 2002). The response **resolves the concern.**

D. HQUSACE COMMENT. (26 August 2002). Savings Per Ton Using Larger Vessels In 40-Foot & 45-Foot Channel. Explain economic basis for the bigger ships for Valero in with condition. Could Valero benefits from bigger ships in the without condition. Would Valero be more efficient if they used larger Suez and lightered in Gulf. Where does Valero get its oil Africa or Persian Gulf? Suggest a sensitivity analysis on the shift to larger vessels by Valero under both the with project and without project conditions. The savings per ton for the current vessels size and planned larger vessels would be shown for the current channel depth of 40-feet and the improved depth of 45-feet. This sensitivity test would show that the induced shift to larger vessels is economically rational under with project conditions or that the savings even at 40-feet are sufficient to induce an economic shift to the larger vessels. In summary, the purpose of the comment is to isolate the depth/payload and resulting improvement in delivered cost per ton, as the basis for the fleet shift to larger vessels.

Response. (6 September 2002). Resolution of this comment requires further discussion. Currently, two thirds of the vessels calling at Valero are lightloaded and are of sufficient design draft to take full advantage of a 45-foot channel. Under with project conditions, the analysis replaced the one third of the vessel fleet that had design drafts less than 45 feet with vessels similar to the larger two thirds of the existing fleet. We believe this is a very reasonable and easily-implemented response to the deepening project that would have significant and immediate cost savings for Valero.

The analysis of alternative with and without project futures suggested in this comment is much more problematic. This implies a complete change in current operating practices for Valero and would require us to make a whole variety of assumptions in order to conduct the sensitivity analysis. First, since existing data on transportation movements

are from St. Eustacia to Valero, we would need 2000 data on shipments from the points of origin to St. Eustacia. Next, we would need to construct a synthetic fleet of vessels to transport the crude directly to the Delaware River. It should be noted that even those refineries that do conduct lightering operations in Big Stone Beach do not use Suezmax tankers exclusively, so there is no reason to presume that Valero would either. We would also need to construct a synthetic schedule of shipments from the various ports of origin to Big Stone Beach anchorage, and determine some method to distribute the tonnage between the vessel fleet (since not all arrive fully loaded). Then we would need to calculate a lightered volume and assume a lightering charge by Maritrans.

In summary, we agree with the intent of the comment (i.e., to isolate the depth/payload and resulting improvement in delivered cost per ton, as the basis for the fleet shift to larger vessels). However, for the reasons cited above we do not believe that the results of this sensitivity analysis would be valid as a basis of comparison to our current practice based approach for calculating transportation cost savings, because of the extremely speculative nature of the numerous assumptions that would need to be made.

Analysis. (6 September 2002). Currently, two thirds of the vessels calling at Valero are of sufficient design draft to take full advantage of a 45-foot channel. Under with project conditions, the analysis replaced the one third of the vessel fleet with vessels that had design drafts of 45 feet. These vessels are similar to the larger two thirds of the existing fleet. The concern **is resolved**.

E. HQUSACE COMMENT. (26 August 2002). Oil Storage Requirements Under With Project Conditions. Reference is made to pages 53 and 54 of Appendix C Benefits Analysis. It is suggested that a concern raised by GAO in their review be addressed in greater detail. GAO was concerned that a short-term surge in cargo would be caused by more fully loaded tankers and this in turn would cause a change in the inventory storage needs of the oil receiving facility. GAO maintained that the scheduling of tankers would cause more storage to be needed because the refineries are set up for just in time delivery under current conditions. Higher cargo payloads on oil tankers could cause a potential interruption of supply, if the tanker with more cargo was delayed. It is suggested that, the current text in paragraph 5.3.1 (Facility / Capacity Constraints) should be expanded. The following information was provided by DMI by electronic mail. I believe this additional information would address the concern. "The lightered tonnage quantities can be considered under the principles of mass balance. i.e., the same quantity of oil is being delivered under with and without project conditions. For vessels that lighter, the same amount of crude will be delivered, all that will change is the proportion of that crude that will arrive at the refinery dock on the lightering vessel versus the mothership. The lightering ship collects its load, hustles to the dock first, discharges its load, and then hustles back to service the next vessel. It is an extremely efficient and time sensitive operation that goes on 24/7/365. This will continue to happen under with project conditions, just with less crude lightered. Later, the mothership arrives at the dock and discharges its load. Under with project conditions it will discharge more, but that is balanced by the fact that the lightering vessel that got there before it just discharged less. The same total amount is being delivered and stored (and

it's growing at only 0.2% per year). Any increased storage needs to handle that 0.2% growth will have to occur under without as well as with project conditions.” “The only exception to the above is Valero, which does not currently nor plan to lighter. Valero indicated that they would bring in larger (and therefore fewer vessels). Valero did indicate the need for additional storage in the \$20-40 million range. However, they also stated that additional storage was being planned under without project conditions, and the amount of additional storage assignable to the deepening project would be in the \$5,000,000 range (See Page C-64).”

Response. (6 September 2002). Change will be made as requested.

Analysis. (6 September 2002). The response resolves the concern.

F. HQUSACE COMMENT. (26 August 2002). Cargo Loading Adjustment for Double Hulls. The double hull vessels need to have a cargo loading adjustment and cost adjustment as compared to single hull vessels. It is not clear why single hull and double hull tankers have the same DWT, length, width and depth. It would be expected that the capacity would decline with the addition of the double hull or the vessel would be deeper, wider or longer to make up for the loss in DWT. The IWR vessel cost tables increase the ship capital costs and no adjustment is made to the capacity. For the Providence Report of the U.S. Army Engineer District New England has pointed out that the capacity is different for single and double hull vessels. Reference is made to page 23 of the DRI-WEFA Commodity Projection and Fleet Forecast, “The Oil Pollution Act of 1990 requires phasing out of single-hull tankers servicing U.S. ports by 2005. Therefore, the cost characteristics and cargo payloads at design and sailing drafts for the double hull oil tanker vessels should be the only vessels in the fleet because project construction will be completed in 2008, after the phase out date of 2005.

Response. (6 September 2002). Concur, double-hulled vessels are the only vessels considered in the projections used in this analysis.

Analysis. (6 September 2002). The response resolves the concern.

G. HQUSACE COMMENT. (26 August 2002). Optimization of Ship Loading. Almost all of the tankers have design drafts that can benefit from channel deepening. Their sailing drafts range from 33-feet to 37-feet. My question is, why is the sailing draft not optimized for the current channel? Under D-Growth the drafts optimize at 42-43-feet in 2008 the first benefit year. Should the optimization proportion be immediately 100%? In the future not all ships would optimize they would incorporate the same institutional inefficiencies that prevent the maximization of sailing draft. The deepening project will make greater sailing drafts possible but will not eliminate the reasons for less than a full shipload.

Response. (6 September 2002). The modeling approach for tankers incorporates existing (2000) lightloading practices and applies them to forecasts for both with and without project conditions for each individual vessel arriving at each individual

refinery. Therefore, some vessels are already fully loaded in 2000, some nearly full now and fully loaded by the base year, and some vessels never fully loaded.

Analysis. (6 September 2002). The model continues lightloading practices for forecasts in with and without project conditions. The concern **is resolved.**

BULK COMMODITIES SLAG AND STEEL.

A. Comment. (26 August 2002) & (6 September 2002). Growth Rates for Steel. Reference is made to page C-47. The annual growth rate for iron and steel was shown as 2.18% for the period 2000-2010. The DRI-WEFA Commodity Projections and Fleet Forecast contains a substantial lower rate of growth on page 47. In the paragraph titled "United States Steel Industry Outlook", a growth rate of 1.9% was applied to the entire decade. The text reads, "By 2011, imported steel- finished products and for conversion-should be about 1.9% above their 1998 levels." The growth rate is important as the steel import benefits would be substantially less under a per decade growth rate of 2% instead of the decade growth of 24% resulting from the compound effect of 2.18% over 10 years.

Response pending. (6 September 2002). District is awaiting input from Dave Miller & Associates.

Analysis. (6 September 2002). Awaiting additional information requested in final comments of 6 September 2002.

Response. (16 September 2002). The annual growth rate (2.18%) used in the analysis to forecast growth in iron and steel imports is the appropriate growth rate. This growth rate was calculated directly from the DRI-WEFA spreadsheets that showed forecasted tonnage in decennial increments from 2000 to 2060. The 1.9% growth identified for the years 1998 – 2011 is for “imported steel-finished products and for conversion” which are a small subset of the larger “iron and steel” category that has been especially hard hit by recent import tariffs.

Analysis. (30 September 2002). The response **resolves the concern.**

B. Comment. (26 August 2002) & (6 September 2002). Design Drafts, Sailing Drafts and DWT. The benefits are dependent upon a shift in the fleet mix to larger vessels in the future. Examination of model data raises the following concerns. First, in the “Comm runs” for year 2009 the DWT gets above 75,000 DWT for both steel and slag carrying vessels. The slag vessels are about 65,000 DWT and the IWR vessel costs show these vessels at a design draft of 42-feet. Therefore the IWR data matched the computations for the slag carrying vessels. However, most of the steel slab carrying vessels are about 43,000 DWT and the IWR vessel costs show the 40,000 DWT ship as having a design draft of 37-feet. The 41-foot (DWT of 43,500) vessels were added to the fleet to handle future growth under without project conditions. Nevertheless, the IWR

vessel costs show that a 40-foot design draft is reached at the 50,000 DWT. Also, a DMA “e” mail on this concern stated, “the average DWT for slag vessels calling in 2000 was 45,121 and the average design draft was 38 feet (from bulker database sheet, from columns G and H rows 8-26), this seems consistent with the IWR data.” Verification is needed the DWT and associated design draft and whether a suitable vessel was utilized in the benefit analysis. Use of a low payload vessel in the without project condition would maximize the benefits in the with-project condition. Secondly, five of the steel slab ships have a sailing draft greater than the design draft. A data verification and or explanation are needed as to why sailing drafts are greater than design drafts. Third, DMA furnished the following information in an “e” mail. “For the without project fleet, DMA used the average DWT of the existing slag and slab vessels (less the 2 described below). For the with project conditions, DMA interviewees (Leo Holt and SJPC) said they would like to shift to larger vessels in the 80,000 DWT range. DMA already had one large slag vessel (Maria Salamon 74,117 DWT, 46-foot design draft) and one large slab vessel (Rani Padmini 76,384 DWT, 45-foot design draft) in the year 2001 arrivals. DMA used these vessels' characteristics for the with project slag and slab fleets. Slag and slab vessels come from the charter market, so there aren't any sunk investment costs that would militate against a fleet shift.” However, the economic basis for a shift to larger vessels with project deepening can be established by comparing the with-project and without-project depths and cost per ton for the small vessels and the larger vessels potentially responding to an increase in project depth. Whether there is a shift to larger vessels is determined by the long run savings in cargo delivery costs from the introduction of higher payload ships.

Response. (6 September 2002). Concur, transportation costs per ton for the with and without project fleet will be calculated as a “reality check” on the assumption that a fleet shift will occur.

Analysis. (6 September 2002). Awaiting additional information requested in final comments of 6 September 2002.

Response. (16 September 2002). In response to this comment, an analysis has been conducted to compare the with- and without-project costs per ton for small vessels and larger vessels to test the rationality of shifting to larger vessels in the with project condition. The results of the analysis indicate that, in the without project condition (40-foot channel), the cost per ton for the existing fleet is less than the cost per ton for a fleet containing larger vessels. This supports the assertion that the existing fleet mix is economically rational, given current channel draft limitations. In the with project condition (45-foot channel), the fleet with the larger vessels exhibits the lower cost per ton, indicating that a shift to larger vessels would be economically rational only under with project conditions. This analysis supports the assertions made by shippers during our interviews that they would employ larger vessels under with project conditions.

The Maritime Exchange data, compiled by the Pilots Association and the Maritime Exchange, indicates that some vessels arrive at drafts greater than the listed design draft.

Since it is unlikely that the vessels are arriving at drafts deeper than the summer load limits, the listed design drafts may be inaccurate.

Analysis (30 September 2002). The DMA analysis on the with project and without project cost per ton supports the assertions made by shippers during our interviews that they would employ larger vessels under with project conditions. The response **resolves the concern.**

C. Comment. (6 September 2002). **Representative Ship for Slag Fleet.** A concern exists regarding the selection of reasonable characteristics of the without versus with-project fleet used to assess project benefits. One vessel (the Rani Padmini) was chosen to represent the entire future fleet for the movement of steel slab cargo. The subject vessel is a 21-year old bulk carrier (DOB 1981) with characteristics that by more current standards of design may be considered atypical of newer bulk carriers built since the mid to late 1980s. The base year of the project under study is 2009. Note that 25 years would have elapsed and few bulk carriers remain in service beyond their fourth to fifth special survey. Review of the world fleet of bulk carriers that may be employed in similar services indicates that summer loadline or maximum design drafts do not generally exceed 43.0 to 44.0 feet (as opposed to 45.0 feet or greater) with DWT ratings of approximately 70,000 to 73,000 DWT's. Alternatively, assuming vessel design is matched to project depths (without the need for tidal advantage), design drafts of 41.0 to 43.0 feet would be applicable with DWT ratings of approximately 65,000 tonnes. However, vessels exceeding 70,000 DWT's tend to be employed for transport of relatively low-value or aggregate bulk cargos (i.e., coal, limestone, etc.). The existing\without-project fleet has a composition largely dominated by carriers in the Handymax class range (with DWT ratings of less than 50,000 DWT's) some or most of which may be geared-bulk service hulls. Typically, vessels of this class or configuration provide breakbulk service for a variety of reasons relative to scale of movement and ability to handle certain cargo loadings, and it should be determined whether such vessel service would continue into the future, even with proposed improvements. Given preceding information, the assumption made in the report that all future vessels will be of a singular class and type is unlikely. It is suggested that a distribution of vessel service and transit drafts be consistent with the without-project condition as more appropriate.

Response. (16 September 2002). Please note that the substance of this comment actually refers to slab, not slag, vessels. In response to this comment, additional analyses were conducted to identify the appropriate with project slab fleet and vessel loading characteristics. In order to remain consistent with other models used in this study, the future fleet is comprised of a distribution of various larger size vessels, comparable to distribution of smaller vessels in the existing fleet. The loading characteristics of the vessels in the future fleet are also based on the observed loading characteristics of the existing fleet. The original analysis based the future vessel loading characteristics on the observed relationship between average vessel sailing drafts (37 feet) and channel depth (40 feet).

The revised analysis modified future vessel loading characteristics based on the observed average efficiency of the existing fleet (i.e., the relationship between average design draft (38 feet) and average sailing draft (37 feet)). Observed average efficiency was calculated as the ratio of observed cargo tonnage to vessel DWT. In this way, the observed loading characteristics of the existing fleet are applied to the future fleet of larger vessels. The result of this analysis indicates that AAEQ benefits were previously understated by approximately \$259,000 (7 percent).

Analysis. Observed average efficiency was calculated as the ratio of observed cargo tonnage to vessel DWT. In this way, the observed loading characteristics of the existing fleet are applied to the future fleet of larger vessels. The response **resolves the concern.**

CONTAINERSHIPS.

A. Comment. (26 August 2002) & (6 September 2002). Container Ship Capacity. The IWR Report 91-R-13 National Economic Development Procedures Manual Deep Draft Navigation dated November 1991 provides adjustments for estimating actual vessel capacity on page 77.

- a) For 70,000 dwt container ships the cargo capacity adjustment factor (fuel, stores, water) is .90.
- b) The cargo density adjustment factor (weight capacity for cubic limits) is .77.
- c) The cargo load adjustment factor (average vs. full payload) is .85.

Question 1. (26 August 2002). Should an adjustment be made for the ballast as discussed in the Lloyds Shipping Economist?

Response. (6 September 2002). Ballast adjustments are not required because sailing drafts are based upon observed sailing drafts as identified in the Maritime Exchange data.

Analysis. (6 September 2002). The response resolves the concern.

Question 2. (26 August 2002). Are the numbers of empty containers included in the cargo load factors?

Response. (6 September 2002). Since actual sailing drafts are used, empty containers are included in the drafts as they actually occur.

Analysis. (6 September 2002). The response resolves the concern.

Question 3. (26 August 2002). Is the weight per container included in the above cargo density factor of .77?

Response. (6 September 2002). Since actual sailing drafts are used, the weight per container is included in the drafts as they actually occur.

Analysis. (6 September 2002). The response **resolves the concern.**

Question 4. (26 August 2002). Container ships carry a maximum of 20% refrigerated containers and there is a need to account for what commodities make up the other 80%. What is the industry source for this limit on refrigerated capacity? This concern is applicable to the projected traffic going from Savannah to Philadelphia.

Response. (6 September 2002). The P&O Nedlloyd vessels are specially designed refrigerated container vessels that carry significantly more than the 20% refrigerated containers carried on typical containerships. These vessels were designed for the frozen meat and poultry and refrigerated produce trade.

Analysis. (6 September 2002). Awaiting additional information requested in final comments of 6 September 2002.

Clarifying Questions 6 September 2002

Question 1) Are the number of empty containers included in the cargo load factors?

Question 2) Is the weight per container included in the above cargo density factor of .77?

Although actual sailing drafts may have been used for existing routes the basis for arriving at the sailing drafts of ships which will sail only in the with project condition needs to be provided.

Response. (16 September 2002). Since the analysis used actual, observed vessel sailing draft data obtained by the Pilots Association, it was not necessary to calculate individual vessel loads or to verify the number of TEUs on board the vessel in order to estimate vessel drafts. However, it is important to verify that vessels are currently depth constrained at the Delaware River. Examples of actual containership arrivals in July 2002 for two P&O Nedlloyd vessels (Encounter and Remuera), both of which are expected to regularly call on Philadelphia under the with and without project conditions, indicate that the vessels are currently arriving at maximum allowable sailing drafts (37.4 ft., and 36.9 ft., respectively) and are considerably less than fully loaded (42 ft. maximum draft).

Analysis. (30 September 2002). Since the analysis used actual, observed vessel sailing draft data obtained by the Pilots Association, it was not necessary to calculate individual vessel loads. The vessels are currently arriving at maximum allowable sailing drafts (37.4 ft., and 36.9 ft. The response **resolves the concern.**

B. Comment. (26 August 2002) & (6 September 2002). Vessel Draft & Tonnage. The vessel design draft, sailing draft and tonnage and origin/destination of commodities carried need to be documented for all three benefiting containership routes. Based upon a DMA “e” mail response. “DMA has confirmed the sailing draft and tonnage for the trips that have occurred at Philadelphia thus far. DMA also confirmed the

routes and ports of call from the companies' published route schedules. Note that these are established routes that have been serviced with smaller ships in the past. DMA has also verified the design drafts and TEU capacities for the new vessels. The report did not claim benefits for the Allianza vessels, only Columbus and P&O. There is no change in transportation costs for Allianza between without and with project conditions (route distances, tonnages and number of trips do not change). Rather, it is a customer satisfaction issue (the customer would prefer Philly to be the first port of call, not NY) and the interviewee was not able to identify how that might affect their costs." The letter and documentation of follow-up phone calls with P&O Ned Lloyd states that they have the vessels already on order. The Columbus line large reefer vessels have already begun to call in 2002, though they aren't at their scheduled 7-day service yet. Based on DMA interviews, only 2 vessel routes are coming in on vessels sufficiently large to benefit from the deepened channel - P&O Ned Lloyd's and Columbus' around the world service that land at Packer Ave. Provide the results of the follow-up communications with (Ned Lloyd) and (Columbus/Crowley/Allianza) to verify the data and DMA methodology as a correct representation of their existing/future practices. The verification of the container ship sailing draft in the with-project condition is critical to the documentation of the containership benefits. The sailing drafts in the Delaware River should be similar to the sailing drafts at prior port and next port. The existing practices for sailing drafts need to be documented and shown how they relate to changes in sailing drafts with deepening.

Response. (6 September 2002). Containership drafts are based upon observed existing (2002) practices. Interviews with carriers and examination of 2002 data indicate that containerships are currently arriving at drafts in excess of channel depths and have been rerouted to New York in order to off load cargo prior to returning to Philadelphia.

Analysis. (6 September 2002). Awaiting additional information requested in final comments of 6 September 2002.

Response. (16 September 2002). Additional follow-up interviews have been conducted with P&O Nedlloyd and Columbus Crowley and will be documented in the final report.

Analysis. (30 September 2002). The response **resolves the concern.**

C. Comment. (6 September 2002). Refrigerated Cargo Capacity. Reference is made to the WebPages of P&O Ned Lloyd. "With increasing demand for refrigerated cargo, P&O Ned Lloyd has taken delivery of new container ships, which have increased number of slots for reefers. The proportion of slots available has risen to over 14% of the total slots. For example, the latest P&O Ned Lloyd Southampton class vessels have 710 reefer slots, providing a refrigerated cargo capacity of 20,000 tons." The ships of this large size do not have all-reefer cargos, so the question becomes what is on the ship other than reefer cargo and is it as dense as the reefer cargo. It is our understanding that the actual number of reefer slots for vessels in this TEU range has generally never exceeded 1,000 slots (typically 400 to 700 slots or less). The P&O website page on refrigerated cargo discusses delivery of a new class of vessel which provide 710 reefer slots in a

6,690 TEU vessel. Available information indicates that vessels may be placed in service with TEU ratings of 4,000-4,300 and approximately 800 refrigerated support slots. No information is presently available concerning any all-reefer vessel in the 4,000 – 4,300 TEU range. This raises questions about the loading practices for the future vessel. If the majority of the containers are not reefer boxes then the rest of the ship could be laden with comparatively less dense cargo, which may not require the same project depth. Such relationships should be reviewed and verified. There is a need to account for what commodities make up the other non-refrigerated portion of the ship cargo.

Response. (16 September 2002). The Hamburg Sud announcement, dated 04Sep02, concerning the vessel sharing arrangement between Hamburg Sud, Columbus Lines, P&O Nedlloyd and others, indicated that the new P&O Nedlloyd 4,100 TEU vessels will be configured with 1,300 reefer slots. An additional analysis is being conducted to identify the refrigerated and non-refrigerated cargo onboard the vessels in the Australia/New Zealand – East Coast US service.

Analysis. (30 September 2002). The response **resolves the concern.**

3. ADDITIONAL GUIDANCE.

A. Comment. (6 September 2002). Deep Draft Vessel Operating Costs. Reference is made to the 12 August 2002 CECW-PG Economic Guidance Memorandum 02-02 Deep Draft Vessel Operating Costs. The approximate 5% reduction in vessel costs may have a significant effect of project justification in light of recent concerns on the potential overstatement of crude petroleum tonnage. Therefore, the benefit spreadsheets also need to account for the new vessel costs.

Response. (16 September 2002). Concur. The 2002 Deep Draft Vessel Operating Costs, provided to the Philadelphia District on September 5, 2002, are currently being incorporated into our transportation cost models and will be presented in the final report. It should be noted, however, that the approximate 5 percent reduction in vessel costs is not expected to have as significant an impact on benefits as postulated in the comment, since the majority of crude oil benefits are a result of lightering cost savings (which do not change), rather than at sea or at dock costs (which do change).

Similarly, the eleven percent reduction in crude oil import tonnage resulting from the WCSC revisions are not expected to have a corresponding eleven percent reduction in benefits, since the number and sailing drafts of vessels have not changed, only the relationship between tonnage and barrels transported. The impacts of both of these changes will be isolated in the revised models to assist all parties in understanding the implications of these revisions on benefit estimates.

Analysis. (30 September 2002). The response **resolves the concern.**

B. Comment. (6 September 2002). Independent Technical Review. HQUSACE used the contracting resources of the Institute for Water Resources to obtain an independent technical review. Planning & Management Consultants, Ltd (PMCL) of

Carbondale Illinois selected highly qualified independent reviewers. Their draft report was furnished electronically earlier this week. Please respond to their concerns. Their final report will be furnished as soon as it is available, which is expected to be around September 10, 2002.

Response. (16 September 2002). Concur. Responses to the ITR/PMCL comments are being prepared and will be provided under separate cover.

Analysis. (30 September 2002). The response **resolves the concern.**

3. COMPREHENSIVE ECONOMIC REANALYSIS REPORT DECEMBER 2002

Comment. (13 December 2002). Sunk Preconstruction Engineering and Design Costs (PED). Reference is made to the revised report, which shows \$10 million in PED costs on page 17 and \$3.3 million of interest during construction for the PED on page 19. The discussion of costs on page A-13 does not include the PED as a future implementation item. The review team is concerned that regulations on sunk PED have not been considered. Note, ER 1105-2-100 dated 22 April 2000 on pages D-8 and D-9 Paragraph (10) (a) states that, "When performing economic updates, expended PED costs will be considered sunk and not included in the benefit-cost-ratio."

Response. (13 December 2002). PED costs presented in the report equaled \$10,025,000 and Interest During Construction (IDC) on PED costs equaled an additional \$3,312,000 (present value). Excluding these two cost categories, the resulting average annual costs (\$20,857,000), benefit-cost ratio (1.18), and net benefits (\$3,802,000) are shown in the revised Table 5-1 on page 21 of the main report. In addition, the sensitivity analyses presented in Section 6 of the report were revised to incorporate this change in average annual costs. As a result, all benefit-cost ratios computed for the sensitivity analyses increased slightly. The most significant changes in the result occurred for the sensitivity analysis on the cost of lightering operations – lightering fleet configuration, and the sensitivity analysis on alternative bulker fleet – steel slabs. The first above sensitivity analysis evaluated whether the choice of the lightering vessel removed from service would impact project justification. The benefit-cost ratio for the deepening project was previously marginally unjustified (BCR 0.99 to 1) if the least-cost vessel of the two smaller lightering vessels is eliminated instead of the more costly of the two smaller vessels with the same capacity. Using the revised project cost information, the benefit-cost ratio for this sensitivity analysis is now above unity (BCR 1.03 to 1). The sensitivity analysis on alternative fleet configurations for steel slab imports evaluated the continued deployment of the without project fleet even under with project conditions. The benefit-cost ratio for the deepening project is marginally unjustified (BCR 0.99 to 1) if the steel slab fleet remains the same under the without and with project conditions. Using the revised project cost information, the benefit-cost ratio for this sensitivity is now above unity (BCR 1.03 to 1)

Analysis. (17 December 2002). The response and changes to the report **resolve the concern.**

Signed
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Review Manager