CECW-PC (1105-2-10a) 14 December 2006

MEMORANDUM FOR CHIEF, CECW-NWD (Mr. Moeslein)

SUBJECT: Argentine, East Bottoms, Fairfax-Jersey Creek, and North Kansas City Levee Units, Missouri River and Tributaries at Kansas Cities, Missouri and Kansas, Interim Feasibility Report and Environmental Impact Statement (August 2006) – Documentation of Review Findings

1. This memorandum forwards the documentation of policy compliance review findings for the subject project proposal. In the opinion of the policy compliance review team, all policy review concerns have been adequately addressed for this phase of project formulation and development.

2. Office of Water Project Review consideration of subject feasibility report and environmental assessment is complete. Questions concerning the HQUSACE policy compliance review of this project proposal may be discussed with review manager, Cliff Fitzsimmons, at 202-761-4527.

Encl

ROBYN S. COLOSIMO, P.E.
Chief, Office of Water Project Review
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DOCUMENTATION OF REVIEW FINDINGS

Argentine, East Bottoms, Fairfax-Jersey Creek, and North Kansas City Levee Units, Missouri River and Tributaries at Kansas Cities, Missouri and Kansas

FLOOD DAMAGE REDUCTION

INTERIM FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT (AUGUST 2006)

13 December 2006

ENCLOSURE

Argentine, East Bottoms, Fairfax-Jersey Creek, and North Kansas City Levee Units, Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
August 2006

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CECW-PC (10-1-7a) 13 December 2006

DOCUMENTATION OF REVIEW FINDINGS

ARGENTINE, EAST BOTTOMS, FAIRFAX-JERSEY CREEK, AND NORTH KANSAS CITY LEVEE UNITS, MISSOURI RIVER AND TRIBUTARIES AT KANSAS CITIES, MISSOURI AND KANSAS

INTERIM FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT AUGUST 2006

A. GENERAL.

1. **Policy Compliance Review Findings.** The following summarizes the final HQUSACE policy compliance review findings for the interim feasibility report and EIS on the proposed modifications of the existing Kansas Citys, Missouri and Kansas project. This summary includes the concerns and the related resolutions of those concerns for the HQUSACE reviews of the August 2006 final interim feasibility report and EIS; the May 2006 draft feasibility report and DEIS; and the March 2005 Alternative Formulation Briefing (AFB) package. In the opinion of the policy compliance review team, all policy review concerns have been adequately addressed for this phase of project development. The AFB review information was originally documented in the CECW-NWD Project Guidance Memorandum (PGM) dated 02 February 2006. The draft report review information was not previously documented, except for the comments that were presented in a CECW-PC memorandum dated 21 July 2006. The final report review information was documented in the CECW-PC Project Assessment Memorandum dated 10 October 2006. The documentation that follows comprises the HQUSACE policy compliance review record.

2. **Project Location.** The Kansas Citys project is located along the lower 10 miles of the Kansas River and along the Missouri River for 6.5 miles above and 12.5 miles below the Kansas River, all in or near Kansas City, Missouri and Kansas City, Kansas. The area covers about 32 square miles of industrial, commercial and residential development.

3. **Authority.** The study was conducted under the authority of Section 216 of the 1970 FCA. The 1936, 1944, 1946 and 1954 Flood Control Acts authorized the Kansas Citys Local Flood Protection Project.

4. **Non-Federal Sponsors.** The City of Kansas City, Missouri is the non-Federal sponsor for the feasibility study. The North Kansas City Levee District, Fairfax Drainage District, and Kaw Valley Drainage District participated in the study as owner and operators of the existing

levees. One of these four would be the non-Federal sponsor for the design, construction and operation for each recommended separable element (see below).

5. **Problems, Needs and Opportunities**. The existing Kansas Citys project consists of 7 levee units along the Missouri and Kansas Rivers. They are operated and maintained by 5 sponsors. Two of the levee units have two reaches with separate sponsors. Some portions of the levees were nearly overtopped in 1993, raising concerns that they would not reliably provide the authorized level of protection against overtopping, underseepage, and structural failure. There is an opportunity to reduce about $56.9 million of average annual flood damages. This interim study addresses potential improvements to increase the project's performance and reliability for 4 of the levee units. One unit does not need improvements and the other two will be addressed in a future study. The Argentine Levee Unit will not safely pass the design flood event. The Fairfax-Jersey Creek Levee Unit (FJCLU) is structurally inadequate at the Board of Public Utilities Floodwall (BPU Floodwall) and Jersey Creek Sheetpile Wall sites. The North Kansas City Levee Unit (NKCLU) has unacceptable failure risks due to underseepage problems at the Harlem Area and National Starch Area sites. The East Bottoms Levee Unit also has unacceptable underseepage problems and related risk of failure.

6. **Plan Formulation**. The plan formulation focused on improving the reliability of the existing levee system and reducing potential flood damages along the Missouri and Kansas Rivers. Analyses of the Argentine Levee Unit considered various levee height increases, flood fighting, tree clearing and channel modification alternatives to improve the level of protection. Analyses of the other 5 sites considered a variety of engineering solutions to correct structural or underseepage problems and thus improve the reliability of the levees. The proposed work at the BPU Floodwall site and both NKCLU sites could correct design and/or construction deficiencies. The proposed work at the Jersey Creek Sheetpile Wall site is reconstruction. Both the Argentine Levee Unit and the East Bottoms Levee Unit solutions are new work. In each case, the NED Plan, i.e. the solution that would provide the greatest net benefits, is the selected plan.

7. **Selected Plan**. The selected plan includes six separate measures:

a. The selected plan to modify the Argentine Levee Unit includes:
   - Raising about 5.5 miles of levee, including 1,338 feet of floodwall, about 5 feet;
   - Modifying or replacing 3 pump stations to accommodate the higher levee;
   - Relocating 14 utility lines; and
   - Establishing a 0.21 acre emergent wetland as ecosystem mitigation.

This modification is new work that requires Congressional authorization. The Kaw Valley Drainage District is the non-Federal sponsor for the design, construction and OMRR&R of this plan.

b. The selected plan to modify the BPU Floodwall includes strengthening about 1,446 linear feet of floodwall to reduce the risk of failure. This modification is design deficiency correction work that can be implemented when funding is provided. The Fairfax Drainage District is the non-Federal sponsor for the design, construction and OMRR&R of this plan.

c. The selected plan to modify the Jersey Creek Sheetpile Wall includes reconstructing about 945 linear feet of sheetpile wall and constructing about 590 linear feet of new sheetpile wall to reduce the risk of structural failure. This modification requires Congressional authorization. The Kaw Valley Drainage District is the non-Federal sponsor for the design, construction and OMRR&R of this plan.

d. The selected plan to modify the Harlem Area includes constructing a buried collector system about 2,600-feet-long and 18-inch-diameter with vaults to enable the Sponsor to pump flows out during flood events and reduce underseepage and the related risk of failure. This modification is design deficiency correction work that can be implemented when funding is provided. The North Kansas City Levee District is the non-Federal sponsor for the design, construction and OMRR&R of this plan.

e. The selected plan to modify the National Starch Area includes the following to reduce underseepage, uplift, and the related risks of failure:

- Installing 20 pressure relief wells, each 12 inches in diameter and 75 feet deep, with pumps;
- Constructing a 2,000-feet-long and 30-inch-diameter pipeline; and
- Constructing a new pump station into the river.

This modification is design deficiency correction work that can be implemented when funding is provided. The North Kansas City Levee District is the non-Federal sponsor for the design, construction and OMRR&R of this plan.

f. The selected plan to modify the East Bottoms Levee Unit includes:

- Installing 17 pressure relief wells, each 10 inches in diameter and 75 feet deep, to reduce underseepage and the risk of failure; and
- Constructing 2,100-feet-long, 30-inch-diameter pipeline to remove the well outflow.

This modification is new work that requires Congressional authorization. The City of Kansas City, Missouri is the non-Federal sponsor for the design, construction and OMRR&R of this plan.

8. <u>Project Costs</u>. The estimated first cost of the total recommended plan is $79,431,000 at October 2005 price levels. LERRD are estimated at $3,608,000. The total equivalent annual cost is estimated at $5,204,000. The estimated costs for each element in the recommended plan are shown in Table 1. The estimated first cost for measures requiring additional authorization

(new work and reconstruction) is $63,382,000. The estimated first cost for deficiency corrections is $16,049,000.

Table 1
Argentine, East Bottoms, Fairfax-Jersey Creek,and North Kansas City Levee Units
Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
Project Costs by Element
(October 2005 Price Level)

Element	Estimated First Cost	LERRD	Total Equivalent Annual Cost
Argentine Levee Unit*	$52,893,000	$2,940,000	$3,570,000
FJCLU, BPU Floodwall	7,879,000	298,000	477,000
FJCLU, Jersey Creek Sheetpile Wall	8,845,000	149,000	520,000
NKCLU, Harlem Area	1,549,000	86,000	93,000
NKCLU, National Starch Area	6,621,000	125,000	423,000
East Bottoms Levee Unit	1,644,000	10,000	121,000
Total	$79,431,000	$3,608,000	$5,204,000

*includes $207,000 in average annual induced damages

9. **Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).** The non-Federal sponsors are responsible for 100 percent of the OMRR&R for the project modifications estimated at $79,000 annually for the total project. The estimated average annual OMRR&R cost for each of the elements is shown in Table 2:

Table 2
Argentine, East Bottoms, Fairfax-Jersey Creek,and North Kansas City Levee Units
Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
OMRR&R Costs
(October 2005 Price Level)

Element	Annual OMRR&R Cost
Argentine Levee Unit	$13,000
FJCLU, BPU Floodwall	3,000
FJCLU, Jersey Creek Sheetpile Wall	3,000
NKCLU, Harlem Area	2,000
NKCLU, National Starch Area	33,000
East Bottoms Levee Unit	25,000
Total	$79,000

10. **Project Benefits.** Implementation of the selected total plan would provide a high level of reliability against a flood with a 1 percent chance of exceedance. The overall reliability against the 1 percent chance flood event would increase from 49 percent to 99 percent for the

Argentine Levee Unit, from 82 percent to 99 percent for the FJCLU sites combined, from 85 percent to 98 percent for the NKCLU sites combined, and from 96 percent to 99.8 percent for the East Bottoms Levee Unit. The selected plan would reduce residual damages from $58,014,000 to $16,610,000. The equivalent annual urban flood damage reduction benefit is estimated at $41,404,000 for the total plan. The equivalent average annual net benefit is estimated at $36,200,000. The benefit-to-cost ratio is about 8.0 to 1. The benefits for each of the elements are shown in Table 3 below. The estimates are based on an October 2005 price level, a 5.125 percent discount rate, and a 50-year period of analysis. The project would also preserve 185 acres of riparian habitat as an incidental benefit.

Table 3
Argentine, East Bottoms, Fairfax-Jersey Creek,and North Kansas City Levee Units
Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
Project Benefits
(October 2005 Price Level)

Element	Equivalent Annual Benefit	Equivalent Average Annual Net Benefit	Benefit-to-Cost Ratio
Argentine Levee Unit	$18,165,000	$14,595,000	5.1 to 1
FJCLU, BPU Floodwall	1,294,000	817,000	2.7 to 1
FJCLU, Jersey Creek Sheetpile Wall	10,720,000	10,201,000	20.6 to 1
NKCLU, Harlem Area	3,896,000	3,803,000	42.0 to 1
NKCLU, National Starch Area	2,970,000	2,547,000	7.0 to 1
East Bottoms Levee Unit	4,358,000	4,237,000	35.9 to 1
Total	$41,404,000	$36,200,000	8.0 to 1

11. Cost Sharing. The non-Federal sponsors are responsible for a minimum cash contribution of 5 percent, all lands, easements, rights-of-way, relocations, and disposal (LERRD) costs, plus additional cash, if necessary, to reach the minimum 35-percent threshold, based on the cost sharing principles of Section 103, Water Resources Development Act of 1986, as amended by Section 202, Water Resources Development Act of 1996. The Federal share of the first cost of the total plan is estimated at $51,630,000 (65 percent) and the non-Federal share is estimated at $27,802,000 (35 percent). See Table 4 below for the cost shares for the total plan and Table 5 for the individual elements.

Table 4
Argentine, East Bottoms, Fairfax-Jersey Creek,and North Kansas City Levee Units
Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
Cost Sharing – Total Plan
(October 2005 Price Level)

Item	Federal Cost	Non-Federal Cost	Total Cost
PED (Percent)	$ 4,963,000 (65)	$ 2,673,000 (35)	$ 7,636,000
LERR&D	$ 0	$ 3,608,000	$ 3,608,000
Flood Damage Reduction	46,667,000	21,520,000	68,186,000
Subtotal (Percent)	$ 46,667,000 (65)	$ 25,128,000 (35)	$ 71,794,000
Total Project (Percent)	$ 51,630,000 (65)	$ 27,801,000 (35)	$ 79,431,000
Associated Costs*		$ 1,898,000	

* Non-creditable relocations

Table 5
Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
Cost Sharing – by Separable Elements
(October 2005 Price Level)

Item	Federal Cost	Non-Federal Cost	Total Cost
Argentine Levee Unit			
PED *	$ 2,222,000 (65%)	$ 1,197,000 (35%)	$ 3,419,000
LERR&D	$ 0	$ 2,940,000	$ 2,940,000
Flood Damage Reduction	32,157,000	14,377,000	46,533,000
Subtotal	$ 32,157,000 (65%)	$ 17,317,000 (35%)	$ 49,474,000
Total Element	$ 34,380,000 (65%)	$ 18,513,000 (35%)	$ 52,893,000
Associated Costs **		$ 1,898,000	
FJCLU – BPU Floodwall			
PED	$ 982,000 (65%)	$ 528,000 (35%)	$ 1,510,000
LERR&D	$ 0	$ 298,000	$ 298,000
Flood Damage Reduction	4,139,000	1,932,000	6,071,000
Subtotal	$ 4,139,000 (65%)	$ 2,230,000 (35%)	$ 6,369,000
Total Element	$ 5,121,000 (65%)	$ 2,758,000 (35%)	$ 7,879,000

* Non-creditable relocations
** Sponsors contribute 25% during the design phase and the remaining 10% the construction phase

Table 5 (Continued)
Missouri River and Tributaries at Kansas Cities, Missouri and Kansas
Cost Sharing – by Separable Elements
(October 2005 Price Level)

Item	Federal Cost	Non-Federal Cost	Total Cost
FJCLU – Jersey Creek Sheetpile Wall			
PED	$ 572,000 (65%)	$ 308,000 (35%)	$ 880,000
LERR&D	$ 0	$ 149,000	$ 149,000
Flood Damage Reduction	5,178,000	2,638,000	7,816,000
Subtotal	$ 5,178,000 (65%)	$ 2,787,000 (35%)	$ 7,965,000
Total Element	$ 5,749,000 (65%)	$ 3,096,000 (35%)	$ 8,845,000
NKCLU – Harlem Area			
PED	$ 233,000 (65%)	$ 126,000 (35%)	$ 359,000
LERR&D	$ 0	$ 86,000	$ 86,000
Flood Damage Reduction	774,000	330,000	1,104,000
Subtotal	$ 744,000 (65%)	$ 416,000 (35%)	$ 1,190,000
Total Element	$ 1,007,000 (65%)	$ 542,000 (35%)	$ 1,549,000
NKCLU – National Starch Area			
PED	$ 655,000 (65%)	$ 353,000 (35%)	$ 1,008,000
LERR&D	$ 0	$ 125,000	$ 125,000
Flood Damage Reduction	3,649,000	1,839,000	5,488,000
Subtotal	$ 3,649,000 (65%)	$ 1,964,000 (35%)	$ 5,613,000
Total Element	$ 4,304,000 (65%)	$ 2,317,000 (35%)	$ 6,621,000
East Bottoms Levee Unit			
PED	$ 299,000 (65%)	$ 161,000 (35%)	$ 460,000
LERR&D	$ 0	$ 10,000	$ 10,000
Flood Damage Reduction	770,000	404,000	1,174,000
Subtotal	$ 770,000 (65%)	$ 414,000 (35%)	$ 1,184,000
Total Element	$ 1,069,000 (65%)	$ 575,000 (35%)	$ 1,644,000

12. Environmental Compliance. A Final Environmental Impact Statement (FEIS) was completed for the project and was filed with the U.S. Environmental Protection Agency on 22 September 2006. The Notice of Availability was published in the Federal Register on 29

September 2006. The comment period ended on 30 October 2006. The EPA Region VII indicated no objection to the proposed project in a 07 November 2006 phone call.

13. State and Agency Review. The State and Agency Review for the final report began 29 September 2006 and ended 29 October 2006. In a letter dated 10 October 2006, the State of Missouri had no comments or recommendations. In a letter dated 27 October 2006, the Department of the Interior did not object to the proposed project and had no comments to offer. In a letter dated 03 November 2006, the Kansas Department of Health and Environment summarized state permit requirements and water quality protection requirements. It noted that the review of HTRW sites is dated and may need to be updated. It encouraged the Corps to participate in an upcoming watershed protection effort. CECW-NWD replied with letter on 22 November 2006 that acknowledged the state's concerns and recommendations. The Department of Agriculture (Natural Resource Conservation Service), Department of Transportation (Federal Aviation Administration), Environmental Protection Agency (Region VII), and Federal Management Agency, indicated by phone or e-mail that they had no comments. No other letters were received.

B. REVIEW COMMENTS ON THE AUGUST 2006 FINAL REPORT AND FEIS.

1. **Apportionment of LERRD Costs.** The cost apportionment table (Table 14 on page 52) must be revised to be consistent with WRDA cost share requirements. The LERRD costs should be shown as 100 percent non-Federal. The Flood Damage Reduction costs should be apportioned as needed to achieve a 65 percent Federal cost share in the subtotal. Note that "allocation" refers to the assignment of costs among project purposes, while "apportionment" refers to the assignment of costs between the Federal government and the non-Federal sponsor.

District Response/Action Taken. Table 14 of the final main report was revised as follows: the title was changed to "Cost Sharing Apportionment -- Overall Recommended Plan"; LERRD costs are shown as 100% Non-Federal, and the flood damage reduction costs and percentages have been apportioned by Federal and Non-Federal amounts to ensure that the cost for the total recommended plan is allocated 35% Non Federal and 65% Federal. A line item for Other Associated Costs (average annual equivalent and not part of the cost-shared project) was added in the Non-Federal column.

HQUSACE Final Assessment. The revisions to Table 14 are adequate. **This issue is resolved.**

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2. **Non-Creditable Relocations and Wharf Area Costs.** The first footnote for Table 20 on page 73 states, "**Other Annual Direct/Associated Costs of Project Implementation include induced damages ($207,000), Non-Creditable Relocations, and Wharf area costs in the Fairfax Jersey Creek Unit.*" Induced damages are discussed on page 64 of the report. Non-creditable relocations are described on page 70 but lack cost estimates. The main report needs to also describe the wharf area work and estimate the cost for the non-creditable relocations and the wharf area work. If this information is already described in the main report, please indicate the location. Both appear to be associated costs that should be included as a separate non-Federal line item in the cost apportionment table (Table 14) below the costs for the total recommended plan (paragraph D-5e(1)(a)(1), Table D-5, ER 1105-2-100).

District Response/Action Taken. Main report Exhibit #15 was revised to add notes at the bottom of the table providing a description of the associated costs (non-creditable relocations in the Argentine Unit and a description of the wharf area costs in Fairfax-Jersey Creek Unit). Table 14 of the main report was revised by adding an "Associated Costs" line item below the costs for the total recommended plan (associated costs are displayed on an average annual equivalent basis). A corresponding table note was added for explanation of associated costs.

HQUSACE Assessment. The Exhibit #15 footnote indicates that the proposed wharf rehabilitation is not necessary to achieve the outputs for the recommended plan and is not a

component of the recommended plan. It further indicates that non-Federal Federal interests would rehabilitate the wharf with their own resources, subject to the District's approval of the plans and specifications. The wharf rehabilitation costs should not be included in the economic analysis or as a project related (associated) cost. The $199,000 cost should be deleted from Table 14, Table 20, Exhibit #15, and Table 53 in the Economic Appendix. The annual net benefits and benefit-to-cost ratios displayed in the report should also be updated accordingly. The District should confirm that the wharf rehabilitation costs are not included in the project construction cost estimates for the recommended plan. Also, what is the "Review of Work by Others Program"? It would be appropriate to discuss the wharf rehabilitation effort elsewhere in the report to inform readers of other activities related to the proposed levee system improvements.

Also, upon further consideration, the induced damages should not be included in the cost apportionment table (Table 14) since there would be no specific outlay by the Sponsor. Table 14, should display the 1st cost of the non-creditable relocation costs ($1,898,000).

Discussion. The District stated that wharf rehabilitation is necessary to preserve the integrity of the existing and proposed Federal project since it is the only protective armor between the levee fill and the river. They suggested that the government rely on a potential commitment from the Sponsor to sue the city if the city does not rehabilitate the wharf. They noted that the Sponsor is adamant about not taking on responsibility for the wharf and that renegotiating the plan with the sponsor and city may take considerable time. HQUSACE stated that unless the levee protection is a project feature with responsibilities defined in the PCA, the Corps could not ensure the project's integrity under during floods. HQUSACE stated that the wharf sheetpile wall must be incorporated into the Federal project, by condemnation if necessary, or some other alternative must be identified in order to ensure and preserve the integrity of the Federal project. Otherwise, the recommended plan must be considered "incomplete" and thus not in compliance with Principles and Guidelines. Once the appropriate correction is identified the Sponsor and possibly the city will need to reconsider their interests and participation. The District agreed to remove the induced damages estimate from the apportionment table (Table 14). The District explained that the "Review of Work by Others Program" is a local phrase for the Corps Inspection of Completed Works O&M activities.

Action Taken. The District re-examined three alternatives to ensure the integrity of the recommended project and determined that constructing an additional section of sheetwall between the levee and the wharf is the most cost effective solution. The District indicated that it coordinated its investigation with the Sponsor and the city, and that both of those parties concurred with the determination. An addendum was prepared that explains the analyses and determination, and adjusts the other report displays for the added costs. The addendum is to be inserted in the front of the final report. Table 14 was revised to display the first cost of the non-creditable relocation costs ($1,898,000) as non-project costs.

HQUSACE Final Assessment. This issue is resolved.

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3. **Underground Storage Tank Removal Costs.** Page 60 says the cost of the Argentine Unit levee raise underseepage berm may be affected by the removal costs for underground storage tanks (USTs), and we do not know the final number and size of the tanks. This presentation implies that we lack feasibility level analyses and our cost estimates are inadequate. OMB has returned reports with such language (e.g., Monarch-Chesterfield, MO). A higher contingency is not a valid replacement for adequate investigations. Page 10 in the Real Estate Plan says all known USTs have been removed, which is much more positive. However, it also says a nearby auto salvage yard located near the project has potential for soil contamination – without characterizing the level of risk and potential cost impacts. Page 60 must be revised to clearly demonstrate that adequate feasibility-level analyses have been completed or reference some other part of the report that does present such information. The total costs of HTRW and UST removal (associated costs) must also be included as a separate non-Federal line item in the cost apportionment table (Table 14) below the costs for the total recommended plan (paragraph D-5e(1)(a)(1) Table D-5, ER 1105-2-100).

District Response/Action Taken. In response to this comment, the District undertook additional field investigation and office review to clarify UST removal requirements for the Argentine unit. The revised findings and recommendations regarding USTs are as follows:

- HTRW database reviews and field investigations have shown that only Argentine Sta 161+00 to Sta 170+00 contains USTs within the recommended project footprint.

- Five USTs are located in the recommended project footprint (specifically the new underseepage berm area) between Sta 161+00 and 170+00. These five USTs are operational with no known leak problems and thus do not really constitute a contamination situation. No abandoned USTs are located in this area.

Using this new information, the plan was revised for the new underseepage berm between Argentine Sta 161+00 to Sta 170+00 as follows:

- One small utility building located near levee Sta 169+00 will be avoided (subtracted from plan).

- Four active USTs in and around Sta 168+00 to Sta 170+00 will be avoided (subtracted from plan). The one active UST near Sta 162+00 is now addressed by a standard removal and replacement action for relocation outside of new underseepage berm area (revised cost).

- An existing asphalt parking area between roughly between Sta 165+00 to 169+00 is now captured in the cost estimate as removal and rebuild (as gravel on top of new underseepage berm) to allow for proper underseepage berm function. The requirement for a new underseepage berm over this parking area was shown previously in Interim Feasibility Report Plate 3 (Arg n500+3 C) and the corresponding REP Argentine mapping but was not captured in the project cost estimate.

- Other portions of the plan for this area remain essentially the same.

The total net impact on the cost estimate is to increase the Argentine unit recommended plan by approximately $20,000. This amount is only 0.04% of the estimated cost of the total Argentine plan. The net effect is inconsequential. The following changes to documentation were made:

- The REP now includes the new quantities of building relocation s.f. on page 7, and HTRW and UST wording regarding the Argentine unit on revised REP pages 6 and 10 are updated accordingly.

- The main report page 60 wording (as cited in the comment above) relating to UST uncertainties is deleted.

- The main report pages 61, 69 and 70 wording is changed to reflect the revised count of count of five buildings (versus previous count of six) affected by the recommended Argentine plan.

- The main report page 68 (last paragraph) relating to UST uncertainties is deleted.

- Costs shown in the Chief's Report applicable to the Argentine unit recommended plan <u>were updated</u> (rounded) to capture the additional $20,000 project cost increase and associated cost shares. As discussed above, the cost change is essentially inconsequential and does <u>not</u> justify the time and expense for changing all the Argentine costs shown in narratives and tables within the supporting documents (REP, main feasibility report, economic appendix, and cost engineering chapter of the engineering appendix). The ripple effect on these supporting products would be substantial and would mean a much larger change package than we are providing herein. The time element involved in changing out such a large number of pages could also become critical along with an increased risk of documentation errors.

HQUSACE Final Assessment. The investigation and various report changes are adequate. **This issue is resolved.**

C. REVIEW COMMENTS ON THE MAY 2006 DRAFT REPORT AND DEIS.

1. Recommended Plan – Economic and Cost Data. The report tentatively recommends actions at six sites. Five of the sites have unique combinations of authority requirements (new versus existing authority) and sponsors. The two North Kansas City sites could be combined into one element since they are both categorized as design deficiency and have the same sponsor. The DE's recommendation should address the five or six sites separately, present sums of the costs and cost shares for the total design deficiency effort and for the total new authorization requests, and then the same information for the entire recommended plan. The "*Description of the Recommended Plan*" section must present the supporting information for each of the five or six sites. In particular, Tables 17 and 18 (Tables 19 and 20 in the final report), and Exhibit 13 (Exhibit 15 in the final report) should present estimates for each of the Fairfax – Jersey Creek measures since they are in different work categories and have different sponsors. The "*Work Categorization*" section beginning on page 69 should present the subtotals for the first costs and cost shares for the tentatively selected design deficiency corrections, reconstruction work, and the new construction. Ultimately, the Chief's report will show separate cost and cost share estimates for the design deficiency, reconstruction, and new work.

District Response. Concur. The main feasibility report will be revised to include the separate supporting site information as required by the above comment for the "DE Recommendation", the "Description of Recommended Plan", Tables 17 & 18 and Exhibit 13, and the "Work Categorization" section.

HQUSACE Assessment. The lower portion of Table 20 in the final report must be revised to show the average annual benefits, net benefits, benefit-to-cost ratios, and residual damages for each separable element, including the BPU Floodwall, JC Sheetpile Wall, Harlem, and Nat'l Starch elements. This can be done either as a replacement page or an addendum to be inserted in the final report copies forwarded to ASA(CW), OMB, Congress and all Corps record copies.

Action Taken. A revised Table 20 shows residual damages, average annual benefits, net benefits, and benefit-cost ratios for each separable element in the Fairfax-Jersey Creek and North Kansas City Units. *Note that benefits and residual damages for each separable element are not additive in determining the benefits and residual damages for the total recommended plan in each unit (see the response in paragraph C-5 below for further explanation of this calculation).*

HQUSACE Assessment. The benefits, residual damages, net benefits and benefit-to cost ratios for the two pairs of separable elements for the Fairfax-Jersey Creek and North Kansas City Units are additive if considered on a 1st added basis. The Jersey Creek Sheetpile Wall site work should be the first added element for the Fairfax-Jersey Creek Unit since its net benefits exceed those of the BPU Floodwall site. The Harlem Area element should be the first added for

the North Kansas City Unit for the same reason. In both cases the numbers displayed for the first added element should not change. The numbers for the second added element should equal the difference between the first added and the combined plans for the individual levee unit. Table 20, Exhibit 15, and Table 53 in the Economic Appendix should be revised accordingly.

Discussion. The District agreed to adjust Table 20, Exhibit 15, and Table 5 to reflect first- and second- added increments for the two North Kansas City Unit elements and separately for the two Fairfax-Jersey Creek Unit elements.

Action Taken. Table 20 and Table 53 were revised to reflect first- and second- added increments for the North Kansas City Unit elements and separately for the two Fairfax-Jersey Creek Unit elements.

HQUSACE Final Assessment. This issue is resolved. Exhibit 15 was not revised, but since it is essentially redundant to Table 20 further revision is not important.

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2. <u>Costs and Benefits</u>. In addition to the constant dollar (first cost) cost estimates displayed in the "*Description of the Recommended Plan*" section of the main report, cost estimates with inflation are also needed in accordance with paragraph G-9e(2), ER 1105-2-100. A version of Table 15 adjusted for inflation would meet this need.

District Response/HQUSACE Assessment/Required Action. Revise Table 15 to include the recommended plan first cost adjusted for inflation (fully funded estimate).

Action Taken. Table 15 of the main report displays the fully funded estimates.

HQUSACE Final Assessment. This issue is resolved.

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3. <u>Other Direct Costs</u>. The "*Other Direct Costs*" developed in Section 7, Appendix C, should be summarized in the "*Description of the Recommended Plan*" section of the main report. Otherwise the impacts and/or requirements for implementing the plan are understated.

District Response/HQUSACE Assessment/Required Action. Revise the main feasibility report "Description of the Recommended Plan" to summarize Other Direct Costs of the recommended plan.

Action Taken. The main report revised Table 20 displays the total annual Direct/Associated Costs for each Unit and separable element; the first note at the bottom of the

table provides the breakdown by type of associated cost. Footnotes describing the Direct/Associated Costs have been added to main report revised Exhibit #15.

HQUSACE Final Assessment. This issue is resolved.

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4. NER Costs. Preserving the 185 acres of riparian trees does not appear to be a net improvement, but rather the preservation of an existing resource. Page 64, Section 7.12, Appendix A, indicates that the trees would be preserved in lieu of clearing them to increase the channel capacity. The report needs to establish that the trees are significant and would warrant mitigation, and then demonstrate that the proposed solution is more cost effective than other mitigation options. The costs would then be included with the other NED costs of achieving flood damage reduction.

District Response. Concur. Report will be revised to show all costs as NED costs. Preservation of the 185 riparian acres will be noted as an incidental environmental benefit of the project. The significance of these trees is indicated by the USFW language contained on page 24 of the DCAR which states that (in regards to the clearing alternative for riparian vegetation): "... *removal of riparian associated with this alternative will be devastating to wildlife populations which will be eliminated.*", and "*Overall, this alternative would significantly damage fish and wildlife resources and their habitat.*", and within the DCAR mitigation discussion section on the bottom of page 25: "*Forested wetland and riparian woodland are consistent with Resource category No. 2 that is, habitats are of high value that are relatively scarce or becoming scarce on a national or regional basis.*" Additional information regarding riparian significance and the desire of the USFWS for compensatory mitigation for unavoidable impacts to this resource are included in the draft EIS, sections 2.2.1 and 3.2.1.

HQUSACE Assessment/Required Action/Action Taken. No further action is necessary.

HQUSACE Final Assessment. This issue is resolved.

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5. Exhibit 9. Totals in the "*Annual Benefits*" column for the Fairfax – Jersey Creek Unit and the North Kansas City Unit appear to be in error.

District Response. Benefit computations were completed in HEC-FDA for each separable feature/site and are based on consideration of the residual risk with implementation of the fix for each separable site or feature. Even when a solution is implemented at each site, it is widely accepted that a minute residual risk of failure remains for extreme flood conditions with water near the top of levee/floodwall.

Geotechnical and structural probabilities of failure for each separable feature or site are not additive for purposes of deriving the total probability of failure for the unit. The modes of failure for the separable features/sites are independent events, and failure for one site or the other, or for both sites must be considered. For the HEC-FDA analysis of implementing a solution at one site/feature or implementing a solution at both sites, a combined (not additive) probability of failure that considers the residual risk of failure at each separable site or feature was calculated in accordance with ETL 1110-2-556 Risk-Based Analyses for Geotechnical Engineering for Support of Planning Studies. The specific formula used for this calculation is as follows: Pr(f)=1-[(1-p1)(1-p2). . .(1-pn)]. This formula yields the combined probability of failure for combinations of separable features, sites, or modes of failure when the same set of structures are subject to damage. Thus, the separable benefits shown for each separable feature or separable site are not purely additive for purposes of deriving the total project benefits for each unit.

In summary, we would maintain that the benefits in the table are correctly shown; however the table will be footnoted to note that the separable benefits for each failure site/mode are not additive.

HQUSACE Assessment/Required Action/Action Taken. No further action is necessary.

HQUSACE Final Assessment. This issue is resolved.

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6. **Environmental Compliance Checklist, EIS.** A list of environmental compliance items should be included in the EIS in accordance with Exhibit G-5, ER 1105-2-100. The list should include a status (such as complete, partially complete, etc.) update for all applicable Federal laws and Executive Orders, for example, section 401 of the Clean Water Act.

District Response/HQUSACE Assessment/Required Action. Include a list of environmental compliance items in the final EIS.

Action Taken. The environmental compliance checklist showing all Federal environmental and social laws, policies, and executive orders has been provided in EIS Table 2-2, page 28. The checklist meets the requirement for disclosure of the compliance status of each environmental law and policy.

HQUSACE Final Assessment. This issue is resolved.

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7. **Environmental Justice.** A summary of outreach efforts that have been undertaken in order to comply with Executive Order 12989 should be included in the discussion of environmental justice issues in the final EIS. Currently, the EIS states that a list of environmental justice contacts provided by USEPA would be used to communicate with potentially affected low-income and minority populations about the project. The EIS should contain a list of specific outreach measures implemented by the District to solicit the views of the populations of concern, such as radio and newspaper ads, Spanish-language ads, meetings with community organizations or leaders, etc. The final EIS should also summarize the views of these populations and describe how the Corps considered their views in the evaluation of the project. Including the above measures in the EIS will help to demonstrate the Corps' compliance with the intent of the executive order.

District Response. Concur. Some additional details regarding our efforts on environmental justice (EJ) outreach can be included in the EIS. We have closely coordinated with the USEPA over the past two years. The EJ portion of the DEIS was reviewed by the USEPA prior to publication. Many modes of outreach were discussed with the USEPA, but their only request was to provide a mailing list of entities to receive NOA and public meeting correspondence. This list included Dos Mundos Newspaper, the Kansas City Hispanic News, Hispanic Economic Development Corporation, the Guadalupe Center, Inc., and others. The USEPA EJ representative attended our recent public meeting and was recognized in the opening comments. The DEIS received an LO (Lack of Objections) rating from the USEPA.

District Response/HQUSACE Assessment/Required Action. Present the information from the response in the final EIS.

Action Taken. Narrative was added to EIS Section 4.15, page 102, first paragraph entitled Environmental Justice Overview. This addition describes the variety of contacts made with community leaders, neighborhood associations, foundations, and media organizations to provide information on the levee project, the notice of availability of documents and notification of the public meetings within the minority communities. Specific contacts within these communities and the method for submitting information to these communities, associations and media outlets were the result of past and present outreach programs EPA has conducted within this industrial community.

HQUSACE Final Assessment. This issue is resolved.

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8. **Fish and Wildlife Coordination Act Report**. Appendix C of the draft EIS contains the draft FWCAR and a supplemental letter from the USFWS. The final EIS should include the final FWCAR from USFWS, and also final reports from the appropriate Kansas and Missouri state wildlife agencies, if any have been received.

District Response. Concur. A Final FWCAR was requested from the USFWS and is expected within a few days. The final FWCAR and comments from Kansas and Missouri state wildlife agencies will be included in the final EIS.

HQUSACE Assessment/Required Action. Present final FWCAR and comments from Kansas and Missouri state wildlife agencies in the final EIS.

Action Taken. The FWCAR is included in Appendix C of the EIS. The FWCAR was placed within the appendix behind the draft FWCAR to display continuity of coordination.

HQUSACE Final Assessment. It was not necessary to include the draft FWCAR in the appendix, but **this issue is resolved.**

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9. Cost Engineering. The subject report seems to lack any discussion of the project cost estimate. The voluminous MCASES printouts in the Engineering Appendix do not satisfy the requirements outlined in ER 11105-2-100 and ER 1105-2-1302 for documentation of the project's cost. In part, the narrative should include a discussion of the scope of the estimate and the major cost components, assumptions, cost sensitivities, and contingencies for the major project features.

District Response. Concur. A good narrative discussion of the cost estimating process will be included in main feasibility report. This narrative will include information on scope, major cost components, assumptions, cost sensitivities, and contingencies for major project features.

HQUSACE Assessment/Required Action. Include a full discussion of the cost estimating process as described in the response in the final main report.

Action Taken. An extensive discussion of the cost estimating process was added and can be found beginning on page 59 of the final main report.

HQUSACE Final Assessment. This issue is resolved.

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10. Utility/Facility Relocations. One of the three privately owned pump stations affected by the Argentine Levee Unit is included as a modification as part of the project. District Counsel should review this matter as it appears that a substitute facility is suggested as just compensation for the private pump station. The proposed removal and replacement of the Kaw Valley Drainage District field maintenance facility also should be reviewed.

District Response. The report does address three privately-owned stations (Santa Fe, Bulk Mail and ConAgra stations) along the Argentine unit. The Santa Fe pump station is the one privately owned station recommended for modification under the cost shared project. This Santa Fe pump station recommendation (middle of page 55 of the draft main report) was an error. In fact, the need for any potential modifications to the Santa Fe pump station was eliminated during the latter stages of feasibility as reported within Chapter A-15 "Argentine Unit Pump Station Analysis" of the Engineering Appendix. The Santa Fe pump station modification recommendation will be struck from the final main report.

The Kaw Valley Drainage District (public entity and project sponsor) owns and maintains the Argentine levee and the Argentine main pump station. The Argentine main pump station is a large, very old station located in the line of protection. The Argentine main pump station is built with an integrated maintenance facility. The Argentine main station has a high risk of catastrophic (structural) failure under severe flood conditions. This station is slated for demolition and replacement in conjunction with the levee raise. A replacement station is deemed essential for a complete and usable facility (i.e. the raised levee). This pump station is properly categorized as part of the construction costs and is not a relocation under LERRD.

We will include a new pump station summary table in the main report in order to better display the recommended pump station modifications and improve clarity of cost category determinations. Our Office of Counsel real estate attorney was closely involved with the development of the current compensability and real estate categorization recommendations, and will also review the new pump station summary table for the final feasibility report.

HQUSACE Assessment/Required Action. The Argentine levee pump plants are shown as existing levee features on one of the maps included in the REP. The maintenance facility is adjacent to and above the Argentine main pump plant, which is slated for replacement as a construction cost. A comment is made in the main report that the market value of certain Argentine unit sponsor real estate, the maintenance facility, is included in the LERRD category of costs, but the cost to demolish the facility is considered a construction cost. If the main pump plant is part of the federal project but the maintenance facility is not, the costs have been properly stated assuming the maintenance facility is located on LERRD not previously provided to the project. Please verify this information.

Action Taken. The revised REP page 2 and the final main report page 55 (pump station discussion) and final main report page 69 (lands and damages discussion) all contain the latest information that state the costs in accordance with HQUSACE assessment above. Information verified.

HQUSACE Final Assessment. This issue is resolved.

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11. Mitigation Acreage. Although minimal, the acreage required for mitigation is not indicated in the main report or REP. The extent (acres) of real estate acquisitions should be presented on page 65 in the presentation of the recommended plan.

District Response/HQUSACE Assessment/Required Action. Add the mitigation acreages to the REP in Section 20, "Other Relevant Real Estate Issues and Remarks".

Action Taken. Mitigation acreage is presented in final main report page 66, and is presented on page 11 of the revised REP.

HQUSACE Final Assessment. This issue is resolved.

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12. Relocation Acreage. It is not clear whether additional acreage is needed for the relocations.

District Response. Concur. Will clarify acreage in Section 11 of the REP which covers "Anticipated Relocation Assistance". Possible acreage needed to relocate these buildings was not listed but costs for P.L. 91-646 benefits were. Also, we recognize that a possibility exists for working around some of these buildings in the PED phase so as to minimize need for removal or relocation.

HQUSACE Assessment/Required Action. The initial comment referred to land required for a utility/facility relocation, not relocation assistance provided under Public Law 91-646. The District needs to identify and reflect the acreage needed for any utility/facility relocations in Attachment 3 of the REP and such costs in section 10 of the REP.

Action Taken. No real estate is needed for utility relocations outside the primary ROW required for the project footprint. All utility relocations can be accomplished inside the proposed levee ROW. Note that Attachment 2 of the REP does reflect all lands needed for the project including utility relocations, and the REP Section 10 does reflect all utility relocation costs.

HQUSACE Final Assessment. This issue is resolved.

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13. Capability Statements. The non-Federal Sponsors' real estate acquisition and financial capability statements are not included.

District Response. Enclosed (removed) are the four Assessment of Non-Federal Sponsors Real Estate Acquisition Capability Checklists and the four sponsor financial capability statements.

HQUSACE Assessment/Required Action/Action Taken. No further action is required.

HQUSACE Final Assessment. This issue is resolved.

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14. Items of Local Cooperation. Use the attached and newer version of the Items of Local Cooperation for this project.

District Response/HQUSACE Assessment/Required Action. Include the updated list of Items of Local Cooperation in the final feasibility report.

Action Taken. The updated list of Items of Local Cooperation is included in the recommendations section beginning on page 83 of the main report.

HQUSACE Final Assessment. This issue is resolved.

D. REVIEW COMMENTS ON THE MARCH 2005 ALTERNATIVE FORMULATION BRIEFING PACKAGE.

1. **Policy Compliance Review Comment Overview.** The documentation proposes measures to reduce risks of structural or geotechnical failure by adding structural reinforcement, new relief wells, a buried collector system, and new sheet pile walls – all as new work rather than corrections of design, construction or other deficiencies. Traditionally, the Corps has avoided labeling project features as design or construction deficient, particularly when the features have operated successfully for nearly 60 years as in this case. However, policies related to this situation are evolving. Similar problems on other levee systems have been recently characterized as design deficiencies rather than new work, and the correction of the deficiencies have been supported by HQUSACE. Describing the solutions here to underseepage control problems and structural problems raises a concern about the uniform application of policy nationwide. As requested in several of the following paragraphs, more detailed information about the history and condition of the subject project will be required to further understand this project's needs and to resolve this and other issues.

District Response. We do not necessarily propose the identified remedies as "new work." Rather, we intend at the AFB to deliberate on the category appropriate to the recommended remedies. None of the individual Phase I remedies, nor any combination of remedies, expand the area protected by the project or increase the degree of flood protection beyond the level intended when the levees were constructed. Some of the available remedies would correct deficiencies in the constructed design.

Discussion. The District presented a matrix with information that categorized the various levee system problems and the related solutions as design/construction deficiencies, new work, or reconstruction. HQUSACE noted that each category has its own different authorization and budget implications. Measures to address deficiencies would be implemented under the existing project authorization. Measures to address changed conditions and reconstruction needs would require new authorization, and would be identified differently in the budget process. See CECW-PB memorandum dated 16 August 2005, subject: Reconstruction of U.S. Army Corps of Engineers Structural Flood Damage Reduction Projects for which Non-Federal Interests are Responsible for Operation, Maintenance, Repair, Rehabilitation and Replacement. Basically, it is a process of elimination. Each problem or need should be first assessed to determine if it is due to a design or construction deficiency. Each problem or need that is not due to a design or construction deficiency should then be assessed to determine if it is due to a maintenance deficiency. Each problem or need that is not due to a deficiency should be assessed to confirm whether it is due to changed conditions or is due to long-term degradation or exceeded service life (reconstruction). HQUSACE said the key criteria for categorizing needs as design deficiencies is the likelihood of failure without proposed corrections. HQUSACE concurred that O&M deficiencies do not appear to be part of the problems. If the work can not be categorized

as design deficiencies, then it is likely to fit as reconstruction, a category equivalent to major rehabilitation for Federally maintained projects. To categorize a need as a design deficiency, supporting information must show why the risk of failure is unacceptable. It should address the imminent nature of failure based on reliability estimates, flood fight and performance history, and stability analyses. Present the supporting numbers. The reliability estimates should be presented for the design flow and some lesser levels to give some perspective. The information should emphasize the nature of the deficiency under the conditions that existed and were forecast at the time of design and construction – not necessarily the actual current conditions. It also needs to factually identify what the original design and construction efforts missed. This is not meant to diminish the efforts of those who conducted the original work. The supporting information should be concise and can be presented as bullets. The District indicated that field information for the Fairfax-Jersey Creek BPU Floodwall Site indicates mechanic failure characteristics that are unacceptable under any design procedures. The Argentine Unit pump stations were built about 1900, modified about 1916 and later incorporated into the Federal project. HQUSACE noted that the great age of the pump stations may render moot any discussion of design performance. No decision was made in the AFB on the categorization of any of the proposed work.

Required Action. The District will provide additional support for the categorization of work as design deficiency or reconstruction, and secure HQUSACE concurrence prior to public release of the draft feasibility report.

Action Taken. Support was provided to the Division and HQUSACE in CENWD-PDD-B memo dated 7 April 2006. HQUSACE provided approval through CECW-NWD memorandum dated 3 May 2006. The section of the draft interim report entitled "*Work Categorization*" under the "*Plan Implementation*" heading provides the determination and recommendation for categorization of the various components of the recommended plan.

HQUSACE Final Assessment. The final report reflects the HQUSACE determination of new work, reconstruction, and design deficiency correction work as directed in the CECW-NWD memorandum dated 3 May 2006. **This issue is resolved.**

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2. <u>Reconnaissance Study – Scope</u>. The District's transmittal memorandum indicates that legislation dictated the scope of the reconnaissance study. What exactly did the legislation dictate? Provide the pertinent legislation text.

District Response. In its report on the FY 1998 Energy and Water Appropriations Bill, the Senate Committee on Appropriations stated:

Kansas City, MO-KS- The Committee is aware that the Kansas City, MO, and Kansas City, KS, flood control study encompasses two States, two rivers, seven separable units, and five separate sponsors; and, therefore, believes that the study area and issues are too large and complex to be adequately addressed by the standard reconnaissance study simplified analysis of limited scope as set forth in current Corps policy. Accordingly, the Committee directs the Corps to use the additional $300,000 provided to scope potential multifeasibility studies, develop associated project study plans and negotiate feasibility cost sharing agreements related to the study.

In its report on the FY 1999 Energy and Water Appropriations Bill, the Senate Committee on Appropriations stated:

Kansas City, MO- The Committee has included $545,000 for the Kansas City, MO, reconnaissance study which is comprised of seven separable levee units, encompasses two States and two major rivers, and has multiple sponsors. Due to the large study area, the complexities, and the large number of interest, the Committee directs that the study not be limited to the 1 year constraint for a reconnaissance study and that the study be scheduled for completion by the end of fiscal year 1999.

Discussion/Required Action. Include the above report language in the draft report.

Action Taken. This language was inserted into the *Planning Constraints* section under the Planning Considerations and Constraints heading of the draft report.

HQUSACE Final Assessment. The language is in the final report. **This issue is resolved.**

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3. **Reconnaissance Study – Guidance.** What specific instructions or criteria for the feasibility study were included in the HQUSACE reconnaissance report approval memorandum? Explain how compliance with the reconnaissance guidance was achieved.

District Response. In a 26 July 2000 2nd endorsement for the Commander, Northwestern Division, the Chief, Planning and Policy Division, Office of Deputy Commanding General for Civil Works offered the following:

1. The subject report and project study plans are approved as the basis for proceeding into the feasibility phase of planning. Based on the intense development behind the levees and the complex interaction between individual levee units we are supportive of limiting the alternatives to be investigated during the feasibility phase to those alternatives that provide a uniform level of protection.

2. The project units of the flood protection plan for the Kansas Citys are so closely related and dependent upon each other for effectiveness that the project can only be analyzed by considering the area as a whole. Given the location of the seven levee units relative to the confluences of the two rivers, formulation based on reaches upstream and downstream of the confluence of the Kansas and Missouri rivers is not technically feasible. The levee units in this study are either at the confluence of the rivers, or within the zone of influence of the confluence. Therefore, all units are interrelated and function as a system in providing flood protection to the area. This the same challenge that was faced by the corps when designing the existing levee system. Furthermore, there are conditions under which failure or flooding of certain levee units may adversely affect adjacent levee units.

You should plan to convene an in-progress review meeting early in the feasibility study to ensure that the study is focused and tailored to meet specific objectives and to revisit the decisions on the alternatives to be studied during the feasibility phase. Based on the results of the in-progress review meeting, the project study plan may need to be revised to better define the depth of analysis required and/or refine study constraints. Submission of the model feasibility cost sharing agreement is not required, provided no deviations are needed.

In a 3 August 2000 3rd endorsement, the Director, Planning and Programs Management, Northwestern Division, stated:

1. Reconnaissance Report and Project Study Plan for subject project have been approved by HQUSACE as the basis for proceeding into the feasibility phase. Specifically, the formulation of alternatives can proceed on the basis of providing a uniform level of protection, in lieu of doing an incremental analysis for the left and right bank levees.

2. As HQUSACE suggests, you should plan a *[sic] convening an in-progress review meeting early in the feasibility phase to revisit the decision on the alternatives to be studied.*

In response to the foregoing guidance, we have:

- Concluded a Feasibility Cost Sharing Agreement with the City of Kansas City, Missouri, in April 2000, consistent with the model agreement;
- Held an in-progress review in October 2002; and
- Formulated alternatives for the levee units based on the approach of a uniform level of protection for all units.

Discussion/Required Action. No further action is necessary.

Action Taken. While no action was required, the language from the discussion was inserted into the *Planning Constraints* section of the draft report so that the reviewers would have full understanding of the study direction and review process.

HQUSACE Final Assessment. This issue is resolved.

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4. Project History. The application of policies for the modification of an existing project requires thorough information on the history of the project's implementation and operation phases. The historical information is needed to fully understand the current state of the project and its needs. The information is particularly important for determining whether proposed modifications should be repair, rehabilitation, replacement, new work, reconstruction (a subcategory of new work), maintenance deficiency corrections, or design/construction deficiency corrections.

District Response. From authority in the 1936 Flood Control Act, construction of the levees began in 1940 and was substantially complete in 1943. Those levees were designed to pass a Kansas River flow of 170,000 cubic feet per second (cfs) with 2 feet of freeboard and a Missouri River flow of 460,000 cfs upstream of the confluence or 540,000 cfs downstream of the confluence, with 3 feet of freeboard. Following the disastrous 1951 flood, parts of the levee system were reconstructed to the authorized levels. In 1971 construction began on modifications to the Argentine, Armourdale and Central Industrial District (CID) levee units to enable them to pass a 390,000 cfs Kansas River flow coincident with a 220,000 cfs flow in the Missouri River upstream of the confluence. Following the Flood of 1993, under authority of Public Law 84-99 to rehabilitate flood control works damaged by floods, a buried collector system in the Fairfax-Jersey Creek unit was replaced and a pumping station in the North Kansas City unit was replaced. Apart from the Federally funded initial construction, the authorized 1962 modification, and PL 84-99 Rehabilitation, the only activity with potential to affect the performance characteristics of a levee unit is the late 1960's repair of a part of a sheet pile wall at the base of the Fairfax-Jersey Creek levee. The sheet pile wall is a feature of the original authorized levee design. In the mid 1960s, the levee sponsors discussed plans to repair a section of the sheet pile wall in the vicinity of a concrete wharf owned by Kansas City, Kansas. The Kansas City District approved the repair plans prepared by the levee sponsor and the repair was accomplished.

Operation and maintenance of the levees is accomplished by the various sponsors and inspected by the Kansas City District. The sponsors maintain operation and maintenance records to the extent they determine useful and we do not inspect or duplicate these records. We have reviewed our inspection records since 1992 and provided a list of those records as Exhibit A (available upon request).

Discussion/Required Action. Include the information from the response in the draft report.

Action Taken. The required information was included under the headings of the draft report entitled **Plan Formulation**, Existing Project Conditions, in the following locations: the section entitled, *Levee Unit Descriptions*; in Table 2 in the section entitled *Construction History and Design Discharge*; in text in the section entitled *Authorized Project Design Hydraulics*; and in Table 6 in that same section.

HQUSACE Final Assessment. This issue is resolved.

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5. **Project History – Construction.** The text describing the existing project does not appear to provide a complete history of all the construction, modification, repair, rehabilitation and replacement actions for each of the project features. List the historical construction, modification, repair, rehabilitation, and replacement actions for the various project features proposed for modification. Describe the existing underseepage features (type, number, size).

District Response. The construction dates for the four levee units addressed in the Phase I study are displayed in the following table. In the locations addressed by the Phase I remedies, the levees are unmodified from the latest completion date indicated in the table. All significant modifications or repairs since the initial construction are described in the preceding response to "Project History."

Unit	**Completed**	**Mod Completed**
Argentine	November 1955	28 April 1978
Fairfax-Jersey Creek	27 June 1955	none
North Kansas City	20 June 1955	none
East Bottoms	27 September 1950	none

Discussion/Required Action. Include the information from the response in the draft report along with a brief description of the modifications of the Argentine Unit completed in 1978.

Action Taken. The discussion was expanded and is found in Volume 2, Chapter 5 of the Engineering Appendix. It is also covered in the draft report under the headings entitled **Plan Formulation**, Existing Project Conditions, in the section entitled, *Levee Unit Descriptions*, and in Table 2 in the section entitled *Construction History and Design Discharge*.

HQUSACE Final Assessment. This issue is resolved.

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6. **Project History – Emergency Work.** Has the project been modified under PL 84-99 and have those actions contributed to the current project conditions or affected the sponsors' OMRR&R requirements? Document any P.L. 84-99 repairs and the sponsors' responses to the recommended actions in inspection reports in order to demonstrate a long-term history of adequate maintenance. Have the sponsors responded in a timely and adequate manner to periodic inspection reports?

District Response. All the levee units have continuously met the requirements for eligibility for the PL 84-99 program since at least 1992, and are regarded by our levee inspectors as maintained to a high standard. The levee sponsors have responded to maintenance requirements in a timely and adequate manner throughout the life of the Kansas Citys project. We reviewed inspection reports since 1992 (see Exhibit A, "Catalog of Kansas Citys Levee Inspection Documents, 1992 to Present") and concluded that only occasionally does a defect linger from one year to the next and nearly every maintenance recommendation is addressed within 2 years. After the Flood of 1993, PL 84-99 activity resulted in replacement of a buried collector system in the Fairfax-Jersey Creek unit and replacement of a pumping station in the North Kansas City unit. These activities may have produced a minor impact on the continuing OMRR&R. Under the requirements of PL 84-99, Federal projects must pass continuing eligibility inspections to maintain Active status. Only Active status projects are eligible for rehabilitation assistance authorized by PL 84-99. For Federal projects, PL 84-99 rehabilitation assistance for damaged flood control works is provided at 100-percent Federal cost excluding any LERRD cost or costs for deferred or deficient maintenance.

Discussion. This issue would be resolved by including the information in the response in the draft report. The cost of the PL 84-99 work resulting from the 1993 flood should be included. This information helps convey a sense of the quality and history of the project.

Required Action. Include the information from the response in the draft report and include the cost of the PL 84-99 work resulting from the 1993 flood.

Action Taken. The required language was included in the section entitled *Emergency Work and Modifications under Public law 84-99*, located under the headings **Plan Formulation**, Existing Conditions.

HQUSACE Final Assessment. This issue is resolved.

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7. **Project History – Foundation Conditions.** Foundation conditions have been a factor in determining whether design or maintenance deficiencies existed for the underseepage control facilities for other projects. That question, in turn, was pertinent to determining whether the

proposed corrections were new work, reconstruction or deficiency corrections. In those cases, the need for new wells was driven, at least partially, by the poor condition of the existing wells. Those wells suffered biological, chemical and physical fouling of the gravel pack due to local foundation conditions and deterioration of wood stave screens due to variable wet/dry conditions. For this project, are there any special foundation or other conditions that create any extraordinary OMRR&R needs for the underseepage facilities? Do the existing relief wells need regular down-well testing and cleaning to maintain their capability?

District Response. Our studies have not identified any special or unusual foundation conditions that would place design of wells or pumping facilities outside the scope of normal sound engineering practice. The well testing schedule and maintenance practices are variable among the levee units. The sponsors have adequately accomplished well maintenance and/or replacement as indicated by test results. None of the remedies identified in the Phase I study address existing well systems or provide substitute solutions for levee performance degraded by poor well performance. The following table summarizes the relief well testing programs for the levee units that have relief wells.

Unit	Description and Location of Wells	Tested	Last Tested	Condition of Well System and Schedule for Testing
East Bottoms	35 Pressure Relief Wells near Kansas City MO : Coal Fired Power Plant	Y	1996	Adequate : Regularly test all wells every 10 years (to test in 2006)
North Kansas City	44 Pressure Relief Wells at the toe of the levee protect KCMO Downtown Airport and Burlington Santa Fe Railroad Yard and Many Industrial Facilities	Y	1998	Adequate: Regularly test all wells every 5 to 10 years.
Fairfax - Jersey Creek Unit	113 Pressure Relief Wells at the toe of the levee protect General Motors Plant, coal fired Power Plant and many Industrial Facilities	Y	2004	Adequate : Regularly test 28 wells every 4 years (to test in 2005)
Armourdale Unit	43 Pressure Relief Wells at the toe of the levee and floodwall protect Industrial Area and Kansas City Southern Railroad	Y	2005	Adequate : Regularly test 10 wells every 5 years (to test in 2006)
Central Industrial Unit	10 Pressure relief wells at the toe of the levee protect Kansas City KS and Kansas City MO - West Bottom Industrial Area	Y	2005	Adequate : Regularly test 10 wells every 5 years (to test in 2006)

Discussion/Required Action. No further action is necessary.

Action Taken. While no action was required, the information was included in section of the draft report entitled *Foundation and Underseepage Conditions* of the draft report, under the headings **Plan Formulation**, Existing Conditions, so that the reviewers would have a full understanding as required by paragraph G-6.h.(1)(a), of ER 1105-2-100.

HQUSACE Final Assessment. This issue is resolved.

8. Project History – Sponsor Responsibilities. Maintenance performance is also pertinent in categorizing the proposed project modifications. What are the sponsors' responsibilities for periodic maintenance, repair, rehabilitation and replacement, particularly for underseepage control facilities? Describe the sponsors' understanding of the relatively detailed local maintenance requirements in Title 33.

District Response. The sponsors of levee units that have pressure relief wells do test, clean, and, occasionally, replace wells. Although we do not require copies of well test results, we often receive them for our information. The Operation and Maintenance Manual for each of the levee units is provided to the sponsor and contains the full text of Title 33 at the time the levees were delivered to the sponsors for operation and maintenance. The levees all have the equivalent of full-time operating staff and these individuals are thoroughly familiar with the details of effective maintenance practices.

Discussion/Required Action. Summarize the maintenance requirements and the District's assessment of the adequacy of those activities in the draft report.

Action Taken. The information was included in the section of the draft report entitled *Project Operations, Maintenance and Inspections* under the headings Plan Formulation, Existing Conditions.

HQUSACE Final Assessment. This issue is resolved.

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9. Project History – Sponsor Performance. Describe the significant maintenance, repair, rehabilitation, and replacement actions actually accomplished to date, particularly for the underseepage control facilities and floodwall proposed for modifications? Have these actions included regular pumping or mechanical/chemical redevelopment of relief wells? Have the sponsors performed their required duties adequately?

District Response. Some of the underseepage control remedies identified in the Phase I study are at locations where underseepage control is not provided in the current design. The sponsors may be maintaining wells at other locations within the same levee unit, but the performance of those wells is not pertinent to the need for the new underseepage controls identified in the Phase I study. A map and explanation will be provided at the AFB.

Discussion/Required Action. Present the history of non-Federal maintenance, repair, rehabilitation, and replacement actions for the projects under study, particularly for those features that warrant corrective actions or other modifications.

Action Taken. The information is provided in the draft report in the section entitled *Major Maintenance & Repair History*, under the headings Plan Formulation, Existing Conditions. No major maintenance is needed at this time to bring the authorized levee system to a fully maintained condition, maintenance has been ongoing and diligently carried out.

HQUSACE Final Assessment. This issue is resolved.

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10. Project History – Relief Well Performance. What is the current condition and performance level of each relief well relative to its original design? Do any of the wells currently require cleaning, rehabilitation or replacement? Are there any performance or other deficiencies? If so, what are the causes?

District Response. None of the underseepage control remedies identified in the Phase I study are at locations that currently have underseepage control. Refer to the preceding response to item 2.b., "Project History" above for discussion of operation, maintenance and inspection records.

Discussion/Required Action/Action Taken. No further action is necessary.

HQUSACE Final Assessment. This issue is resolved.

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11. Project Deficiencies – Authorized Level of Protection. What is the authorized level of protection or discharge for each levee unit? Present the pertinent text from the 1936, 1944, 1946 and 1954 Flood Control Acts, as modified, and key text from any Chiefs or other reports cited in those acts to support this determination. Was the authorized project performance further modified by any other legislation?

District Response. In the catastrophic 1951 flood, some levees at Kansas City were overtopped and heavily damaged. Based on the 1951 flood experience, the Kansas River Basin system was reexamined and Congress authorized that system and the Kansas Citys levees in the1954 Flood Control Act. The design is for a Missouri River discharge of 540,000 cubic feet per second and a Kansas River discharge of 170,000 cubic feet per second. In the 1962 Flood Control Act, Congress authorized modifications to the Argentine and CID levee units to enable them to pass a Kansas River discharge of 390,000 cubic feet per second coincident with an upper Missouri River discharge of 220,000 cubic feet per second. For discussion at the AFB, we will produce a comparison of the various descriptions of levee performance beginning with authorization.

Discussion/Required Action. Include the information from the response in the draft report.

Action Taken. The required information was included under the headings of the draft report entitled **Plan Formulation**, Existing Project Conditions, in the section entitled *Levee Unit Descriptions*, in Table 2 in the section entitled *Construction History and Design Discharge*, in text in the section entitled *Authorized Project Design Hydraulics*, and in Table 6 in that section.

HQUSACE Final Assessment. This issue is resolved.

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12. Project Deficiencies – Design Level of Protection. Based on the text on page 10 of the Planning Narrative, it appears the authorized and design discharges may be different. What was the original design level of protection or discharge for each levee unit? How did the design levels of performance change with subsequent levee or floodwall modifications?

District Response. The design level of performance for the Argentine and CID units increased with the completion of the 1962 modification. The other units have the same nominal level of performance authorized in 1944.

To adapt our modern analytical tools and procedures to the 1950s design of the constructed project, we used updated hydrologic and hydraulic modeling to estimate the overtopping risk of the constructed levees for 1- and 0.2-percent chance of occurrence flood events. Exhibit B, "With Project Engineering Performance/Reliability Improvements for Phase I Units" shows these reliability estimates. These reliabilities are not directly comparable to the discharge-plus-freeboard performance criteria used for the levee design.

Discussion/Required Action. Include the information from the response in the draft report.

Action Taken. The required information was included under the headings of the draft report entitled **Plan Formulation**, Existing Project Conditions, in the section entitled, *Levee Unit Descriptions*, in Table 2 in the section entitled *Construction History and Design Discharge*, in text in the section entitled *Authorized Project Design Hydraulics*, and in Table 6 in that section. More detail is provided in Volume 1 of the Engineering Appendix, paragraph A-2.4.1.

HQUSACE Final Assessment. This issue is resolved.

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13. Project Deficiencies – Existing Level of Performance. What is the existing level of performance for each levee unit relative to its authorized and design levels, including the existing

underseepage features and the floodwall? What is the reliability of each levee unit? Explain the differences between the design and existing levels of performance and the underlying causes. Describe the degradation and related problems in greater detail to account for differences between the existing versus authorized or design levels of performance. In particular, describe the potential structural and geotechnical failures cited on pages 30-31 of the Planning Narrative and the consequences in more detail. What is the existing and projected reliability of each levee unit if no action is taken? What are the estimated costs and other impacts if no action is taken? What are the most likely actions that would be taken if there were a failure to perform? Much of this information should eventually be included in the draft feasibility report sections addressing the existing and future conditions without a project. It will also help establish the need for action.

District Response. The levee units were authorized to pass specified discharges on the Kansas and Missouri Rivers with either 2 or 3 feet of freeboard. Exhibit C, "*Authorized, Design, and Existing Condition Overtopping Levels of Performance for Phase 1 Units*" summarizes levels of performance against overtopping, and individual failure site performance levels. Exhibit D, "*Existing Condition Level of Overall Performance for Phase 1 Units*" displays levels of overall performance for Phase 1 Units, consequences of failure, and likely actions in the event of failure.

Discussion/Required Action. Include the exhibit information from the response in the draft report.

Action Taken. The authorized design discharges of the levee units are well documented per responses to previous comments. The authorized levels of protection for the levees were developed only in the form of discharges. A summary of the existing reliability and performance of the project for the without and with project conditions are provided at Exhibits 4, 5, 6 and 11 of the draft report. Discussion of these issues is included in the sections of the draft report entitled *Initial Assessment of Levee Integrity, Review of Levee Elevations,* and *Final Assessment of Levee* Integrity, under the headings Plan Formulation, Existing Project Conditions. More information is included in Sections 3.8, 3.9, 4.5 and 4.6 of the Economic Appendix.

HQUSACE Final Assessment. This issue is resolved.

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14. Project Deficiencies – Maintenance Deficiencies. Is any work needed to bring the project features to a fully maintained condition? What is the implementation plan for such work?

District Response. No major maintenance is needed to bring the levee system to a fully maintained condition.

Discussion/Required Action. Include the information from the response in the draft report.

Action Taken. The information is provided in the draft report in the section entitled *Major Maintenance & Repair History*, under the headings **Plan Formulation**, Existing Conditions. No major maintenance is needed at this time to bring the authorized levee system to a fully maintained condition, maintenance has been ongoing and diligently carried out

HQUSACE Final Assessment. This issue is resolved.

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15. Project Deficiencies – Underseepage Problems. The read-ahead recommends additional relief wells and a buried collection system as "new work" requiring new authorization to solve underseepage problems. Two other projects previously identified the need for additional relief wells and the clean out of existing relief wells as a "design deficiency" to be undertaken under original project authorities. In response, HQUSACE concurred that the new wells for those underseepage problems could be classified as corrections for project design deficiencies in accordance with ER1165-2-119, Water Resources Policies and Authorities, Modifications to Completed Projects. The potential discrepancy between those projects and the Kansas Citys project raises a concern about consistently applying policy nationwide. The question becomes, why shouldn't we characterize the current underseepage problem as a design deficiency? To help resolve this matter, assess the current capability and efficiency of the existing underseepage systems relative to their original design and to the project's current needs.

District Response. The underseepage systems in place are effective for the levees that they serve in the system. The Phase I study identifies locations where neither wells nor buried collectors were included in the completed project, but underseepage control is now demonstrated to be necessary to the reliable performance of the levee. While improved underseepage control would be justified by the benefits of improved levee reliability, the area protected is not expanded and the level of protection is not raised above the authorized level. Consequently, these locations are candidates for correction of design deficiencies. At other locations, levee modifications to respond to changed conditions (e.g., updated basin hydrology) would trigger an increased requirement for pumping that could not be satisfied by the system in place. The applicability of the present authority to these features is a topic we wish to address at an Alternative Formulation Briefing.

Discussion. Regarding the first case in the response about design deficiencies, the two other projects cited in the comment had a history of flood fighting issues due directly to deficiencies. In the Kansas Citys project, the determination will depend in part on the performance history in the respective levee reach. The draft report will need to fully document

the considerations leading to the determination, particularly the history of performance problems due to the original design and construction – as well as the current assessment of existing and future reliability. Regarding the second situation in the response wherein modifications are needed to address changed conditions, paragraph 7a(2) of ER 1165-2-119 specifically states that the modification of local protection projects is not eligible under the existing project authority. New authority would be needed to implement such modifications. Any additional underseepage control capability necessitated by modifications to address changed conditions would be implemented under the same new authority as the modifications. This concern will be resolved by the actions required in paragraph 1 above.

Required Action/Action Taken/HQUSACE Final Assessment. See paragraph 1 above.

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16. <u>Project Deficiencies – Argentine Levee Unit</u>. Describe why the existing Argentine levee does not currently provide the authorized level of protection. Is settlement or loss of material part of the cause? Title 33 requirements for levee maintenance and operation require the sponsor to assure that no unusual settlement or loss of levee grade has occurred and no low reaches exist, which may be overtopped. Are there reliability or failure problems that would persist if the levee were not raised? If so, the Argentine Unit alternatives on page 30 of the Planning Narrative should include a plan that addresses failure risks without increasing levee height. This would help establish whether the incremental investment in raising the levee height is advisable.

District Response. The unsatisfactory reliability of the Argentine unit is not attributable to settlement or loss of material, but it is attributable to multiple defects some of which would persist without raising the levee. If the levee is not raised, reliability concerns would persist for the levee embankment, floodwall, and for two pump stations: Strong Avenue and Argentine. Argentine Alternative 4 (No Raise, Pump Station Improvements and Earthwork) addresses these reliability and failure problems, with no levee raise. We have prepared an analysis of the reliability improvement to the Argentine levee exclusive of raising the levee. Exhibit B, "With Project Engineering Performance Reliability Improvements for Phase I Units" displays the estimated reliability of the four alternatives considered for the Argentine Unit.

Discussion/Required Action. Include an explanation of why the existing Argentine levee does not currently provide the authorized level of protection and the information from Exhibit B in the draft report.

Action Taken. It is established that the authorized design level of discharge for the Argentine Unit is 390,000 cfs. Subsequent hydraulic analysis indicates that the unit will not pass the design level of discharge. It states this in the draft report in the paragraphs under "Lower

Kansas River Levee System", under the section *Final Assessments of Existing Levee Integrity.* Exhibit 4 of the draft report states the reason for the difference between design and existing level of performance, which involves the development of a current hydraulic model calibrated to the 1993 flood, and changes in physical characteristics of the river.

HQUSACE Final Assessment. This issue is resolved.

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17. <u>Project Deficiencies – Floodwall Structural Failure Risk</u>. Why shouldn't the Board of Public Utilities floodwall structural failure risk be considered a design deficiency and analyzed in accordance with ER 1165-2-119?

District Response. The Kansas Citys project is a local protection project. As explained in paragraph 7.a. of ER 1165-2-119, an action must meet five tests to be considered a design deficiency. The second test requires that the defect not be the result of changed conditions. The current low estimate of reliability for the floodwall proceeds from a combination of updated hydrologic and hydraulic modeling and recognition that the original design criteria would not have produced a design adequate for the currently expected threat. Since changes in the hydrologic and hydraulic conditions are partly responsible for the poor reliability of the unit, the appropriate category for this remedy needs to be resolved at the AFB.

Discussion. The inability of the original design to perform reliably under changed conditions is not necessarily a deficiency. A deficiency involves an inability to perform under conditions that existed or were forecast at the time of design. Unless this criterion is met, the work at this site should be categorized as new work to address a changed condition, which would require additional authority. This concern will be resolved by the actions required in paragraph 1 above.

Required Action/Action Taken/HQUSACE Final Assessment. See paragraph 1 above.

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18. <u>Reliability – Estimate Method</u>. It is not clear how reliability was estimated for the levee, floodwall, and underseepage facilities, and whether the method is in accordance with paragraphs 3-3b(2), E-18d, E-18b(2)(a), and E-19o(6) of ER 1105-2-100. Page 29 of the Planning Narrative says that for each levee unit, the lowest point on the levee/floodwall was used to derive an "adjusted top of levee elevation", which was then used in a model to compute the exceedence probability for a series of flood events. Explain this in greater detail. How did this procedure incorporate the Probable Failure/Non-Failure Point analysis procedures required by paragraph E-19n(1)(d)(2) of ER 1105-2-100 and by ETL 1110-2-556, Risk-Based Analyses for

Geotechnical Engineering for Support of Planning Studies? How was the reliability estimated and used for the floodwalls and underseepage facilities?

District Response. Geotechnical and Structural engineers determined the most likely expected modes and sites of failure prior to overtopping in each Unit. A full range of conditional probabilities of failure versus river stage elevation encompassing the PFP and PNP were determined by geotechnical and structural engineer PDT members for each site/mode of failure in each Unit.

The geotechnical probabilities of failure were developed based on procedures identified in ETL 1110-2-556, Risk-Based analyses for Geotechnical Engineering for Support of Planning Studies, except that the acceptable factor of safety identified in the ETL was modified to a more realistic factor of safety based on Kansas City District 1993 flood observations and experience.

To produce the structural probability of failure versus river stage curve, critical sections of each structure were analyzed (stability and strength factors of safety determined) using material strengths and soil properties. Next, the soil and material parameters were varied to plus and minus one standard deviation from the mean, one at a time, and the factor of safety was recomputed. A Taylor series expansion was used to compute a probability of failure.

The elevation versus probability of failure relationship developed by the geotechnical and structural engineers for each potential failure site/mode was then translated to the index point of the reach, and each individual potential failure site/mode was determined to be independent. The probabilities of failure for each site/mode were then combined using a formula contained in ETL-1110-2-556 to derive a single combined probability of failure versus river stage curve that accounted for all the sites or modes of potential failure. The resulting combined probability of failure curve was entered into the Hydrologic Engineering Center Flood Damage Reduction Analysis program (HEC-FDA) study file in the "Levee Features" section.

Discussion. The response resolves this concern, subject to the ITR confirming that the engineering procedures are appropriate. The information in the response should be included in the Engineering Appendix that normally accompanies each feasibility report.

Required Action. Include the information from the response in the Engineering Appendix.

Action Taken. Volume 2, Chapter 4 of the Engineering Appendix addresses the risk and uncertainty based assessment of geotechnical levee integrity in detail. The structural analysis is presented to a similar level of detail in Volume 3, Chapter A-12.

HQUSACE Final Assessment. This issue is resolved.

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19. <u>Reliability – Probability of Failure – ITR</u>. A comment in the ITR documentation challenged the methods used to develop the probabilities of failure. The resolution of the comment called for obtaining HQUSACE concurrence. What is the status of obtaining HQUSACE concurrence and who is the HQUSACE contact on this issue? This issue is significant because the methods used to estimate the probabilities of failure might affect the results of the economic analysis.

District Response. The District adopted a proven method for estimating the probability of structural failure and considers that little or no value can be added by duplicating the analysis using a different method. ITR suggests that another method is the only acceptable method. At the AFB, we will present our support for confidence in the analysis we have performed and request resolution of the technical issue by approval of our analysis.

Discussion. A technical conference held late last fall addressed the reliability analyses and resolved the related issues. HQUSACE asked and CELRL confirmed that the draft report ITR documentation would present the final resolution of this issue.

Required Action. Document the HQUSACE concurrence with the methods used in this study in the draft report ITR documentation.

Action Taken. Documentation addressing this issue is recorded in ITR documentation as follows:

a. On 13 Jan 06, the official District notes from the vertical team technical conference (01 Dec 05 Structural Summit) were made available via FTP site to CENWD, and CENWD subsequently provided FTP access notification to HQUSACE for these notes. The notes contain the following statements as to HQUSACE concurrence with the methods presented in the Structural Summit:

> "*The Taylor Series methodology was discussed and generally deemed adequate for use in these feasibilities studies as the NWK team is working within certain assumptions of no time-related degradation on the structures (hazard functions do not apply), and basically the structures involved follow certain linear behavior assumptions inherent to a Taylor Series approach. It was agreed that this would be explained further in the feasibility report (this acceptance of Taylor Series use and the general discussion was consistent with the phone conversation between CENWK and HQUSACE on 8Jul05).*"

"The meeting concluded with general consensus that the structural analysis procedures and protocol offered by CENWK was appropriate for the Kansas Citys and Topeka feasibility studies."

Note that the Structural Chapters in the Engineering Appendices contain several pages expanding upon the methodology as discussed in the 01 Dec 2005 Structural Summit (which fulfills the "explained further in the feasibility report" commitment quoted from above notes).

b. The ITR certification forms for the draft interim feasibility report product include the following statement under the heading of: "*...major issues that arose and were resolved through the ITR process*":

"ITR review of the CENWK use of the Taylor Series methodology in structural risk and uncertainty analysis surfaced the need for a HQUSACE consideration of the procedures involved. Monte Carlo simulation was often discussed as an alternative approach but Kansas City District found it difficult and expensive to apply with little technical value added to the specific feasibility analysis process at hand. During the 01 Dec 05 Structural Summit, this topic was discussed with HQUSACE and other Corps structural experts. It was determined that the Taylor Series method was generally deemed adequate for use in this feasibility study given the CENWK assumption of no time-related structural degradation (hazard functions do not apply), and given that the structures involved follow certain linear behavior assumptions inherent to a Taylor Series approach."

HQUSACE Final Assessment. This issue is resolved.

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20. <u>Reliability – Performance/Reliability Improvements</u>. A major objective of this study is to improve the reliability and/or performance of the various levee units. One exhibit shows the reliability for the recommended plans but not the other competing plans. What is the level of performance and reliability for the existing facilities and each alternative? How much would each alternative increase the level of performance and reliability relative to the existing, design and previously authorized levels?

District Response. Exhibit C, "Authorized, Design, and Existing Condition Overtopping Levels of Performance for Phase 1 Units" summarizes the Existing Condition and Future Without Project Condition reliabilities against the 1- and the 0.2-percent-chance event for each Phase 1 levee unit. The Future With-Project Condition reliabilities against the 1- and the 0.2-percent-chance event and the incremental increase in reliability are also displayed for each alternative evaluated.

Discussion/Required Action. Include the information from Exhibits B and C in the draft report.

Action Taken. Exhibits 10 and 11 of the draft report display the relative performance and reliability, as well as the effects of the alternative plans considered.

HQUSACE Final Assessment. This issue is resolved.

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21. Argentine Levee Unit Modifications – Optimum Levee Height. Recommendations for raising the levee should be based on an incremental analysis in accordance with paragraph 2-4e of ER 1105-2-100 and an analysis of risk in accordance with EM 1110-2-1619.

District Response. In accordance with sponsor desires to control study costs, three levee raises were evaluated for the Argentine Unit. A fourth Argentine alternative with pump station improvements and earthwork, no levee raise, has also been evaluated. The analyses of the Argentine raises were accomplished using HEC-FDA for the risk and uncertainty analyses, and all required uncertainties were input into the program. HEC-FDA outputs provided the benefits of each alternative (difference between future with and without project damages) to assist in indicating economic performance, and also provided the engineering performance results for the Argentine alternatives.

As displayed in the Economic Performance table below, the incremental benefit of each succeeding levee alternative evaluated exceeds the incremental cost of the raise, and with each successive raise alternative, net benefits increase, but at a decreasing rate. Two other tables, *ENGINEERING PERFORMANCE OF ALTERNATIVES* and *Conditional Probability of Design Non-Exceedance—Argentine Unit*, display other key inputs to the performance analysis:

ECONOMIC PERFORMANCE OF ALTERNATIVES

Incremental Analysis of Costs and Benefits for Argentine Raise Alternatives

Oct 04 prices, 50 year period of anal, 5.375% interest rate, $000

Alt	Proj First Cost	Proj Economic Cost	Total Annual Cost	Total Annual Benefits	Net Benefits	Increm Cost (Annual)	Increm Benefits	Increm Benefits/ Increm Costs	% incr in annual costs over previous alternative	% incr in annual benefits over previous alternative	%incr in net benefits over previous alternative
Arg 4, No Raise, Pump Sta Modif & Earthwork	$15,598.0	$16,940.6	$994.4	$12,481.4	$11,487.0	$994.4	$12,481.4	12.6			
Alt 1, Arg Nom 500+0 Raise	$30,372.0	$33,398.0	$2,178.6	$14,406.5	$12,227.9	$1,184.2	$1,925.1	1.6	119%	15%	6%
Alt 2, Arg Nom 500+3 Raise	$52,568.0	$58,456.0	$3,644.7	$16,399.0	$12,754.3	$1,466.1	$1,992.5	1.4	67%	14%	4%
Alt 3, Arg Nom 500+5 Raise	$65,964.0	$73,243.0	$4,544.2	$17,389.3	$12,845.1	$899.5	$990.3	1.1	25%	6%	1%

ENGINEERING PERFORMANCE OF ALTERNATIVES

Long Term Risk--Argentine Unit

Plan	Top of Levee/ Floodwall Elevation (ft msl)	Annual Performance (Expected Annual Probability of Design Being Exceeded	Equivalent Long Term Risk (Probability of Exceedance Over the Indicated Time Period		
			10 years	25 years	50 years
Future Without Project Condition	776.0	0.013	0.1214	0.2765	0.4765
Alt 4, No Raise, Pump Station Modifications & Earthwork	776.0	0.004	0.0420	0.1026	0.1947
Alt 1, Nom 500+0 Raise	778.24	0.003	0.0314	0.0767	0.1476
Alt 2, Nom 500+3 Raise	781.24	0.002	0.0203	0.0499	0.0974
Alt 3, Nom 500+5 Raise	783.24	0.001	0.0141	0.0349	0.0685

Conditional Probability of Design Non-Exceedance—Argentine Unit

Plan	Top of Levee/ Floodwall Elevation (ft msl)	1% Event		0.2% Event	
		Conditional Probability of Design Containing 1% Event	Incremental Increase in Performance of Each Successive Alternative Against the 1% Event	Conditional Probability of Design Containing 0.2% Event	Incremental Increase in Performance of Each Successive Alternative Against the 0.2% Event
Future Without Project Condition	776.0	0.50	-	0.09	-
Alt 4, No Raise, Pump Station Modifications & Earthwork	776.0	0.90	0.40	0.36	0.26
Alt 1, Nom 500+0 Raise	778.24	0.95	0.05	0.47	0.11
Alt 2, Nom 500+3 Raise	781.24	0.98	0.03	0.63	0.16
Alt 3, Nom 500+5 Raise	783.24	0.99	0.01	0.72	0.10

Discussion/Required Action. Include the information from the response in the draft report.

Action Taken. This information has been updated and presented in the draft Economics Appendix in Tables 37, 38, 40, 41, 57. Exhibits 9 and 11 of the draft report also summarize incremental performance for the alternatives and the recommended plan.

HQUSACE Final Assessment. This issue is resolved.

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22. <u>Argentine Levee Unit Modifications – Maximum Net NED Benefits</u>. The text supporting the net benefits curve on page 4 of the AFB Documentation Listing states that the analyses infer that the NED Plan is larger than the "Nominal 500+5 ft Raise Alternative." The analyses presented indicate that the plan that maximizes net NED benefits is <u>not</u> larger than the "Nominal 500+5 ft Raise Alternative." A smooth curve can be plotted through the three points on the net benefits curve. Such a curve shows that the maximum net NED benefits occur halfway between the "Nominal 500+3 ft Raise Alternative" and the "Nominal 500+5 ft Raise Alternative". However, this may be moot due to the next comment.

District Response. Concur. The Nominal 500+3 ft raise alternative is designated as the NED plan.

Discussion/Required Action/Action Taken. This issue is superseded by the resolution of the next comment. No further action is necessary in response to this particular comment.

HQUSACE Final Assessment. This issue is resolved.

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23. <u>Argentine Levee Unit Modifications – Designating the NED Plan</u>. The three Argentine Unit levee raise alternatives have very similar net benefits: $8.5 million for the "Nominal 500+0 ft Raise Alternative", $9.0 million for the "Nominal 500+3 ft Raise Alternative", and $9.1 million for the "Nominal 500+5 ft Raise Alternative." These are incremental differences of 5.7% and 0.8% respectively for the net benefits. The incremental costs increase 75% and 25%, respectively. In accordance with Exhibit G-1, Section 4 of ER 1105-2-100, "*Where two cost-effective plans produce no significantly different levels of net benefits, the less costly plan is to be the NED plan, even though the level of outputs may be less.*" Based on this guidance, the "Nominal 500+3 ft Raise Alternative" should be designated as the NED Plan. Are there other significant impacts that would warrant designating a larger plan as the NED Plan?

District Response. Concur. The Nominal 500+3 Raise alternative is designated as the NED Plan; there are no other significant impacts that would warrant designating a larger plan as the NED Plan.

Discussion/Required Action. Include the information from the response in the draft report.

Action Taken. Exhibit 9 of the draft report depicts the selection of the NED plan for the Argentine alternative. It includes a footnote for the NED alternative component for the Argentine Levee explaining the reason for selection of that alternative. This is also addressed in Paragraph 5.0 of the draft Economic Appendix.

HQUSACE Final Assessment. This issue is resolved.

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24. <u>Argentine Levee Unit Modifications – NED Exception</u>. The text on page 4 of the AFB Documentation Listing states that the sponsor may pick a Locally Preferred Plan (LPP). Once HQUSACE concurs with the appropriate designation of the NED Plan and the sponsor selects its preferred plan (LPP), the need to request an exception from the ASA(CW) to recommend a plan other than the NED Plan should be addressed in accordance with paragraph 2-3f(1) of ER 1105-2-100. If an exception is needed, the request should be coordinated with the CECW-NWD RIT and ASA(CW) staff immediately in accordance with Exhibit G-6 of ER 1105-2-100. The LPP will need to be documented in the draft report in accordance with paragraph 2-

3f(4) of ER 1105-2-100. This issue needs to be resolved before the draft report is released for public review.

District Response. Concur. The requirement for approval to recommend an LPP prior to public release of a draft Feasibility Report should be documented in the Project Guidance Memorandum.

Discussion. CENWD said Secretary of the Army approval may be needed before releasing a draft report that recommends a locally preferred plan (LPP). The District indicated that the Sponsor is currently undecided on whether to request a LPP. HQUSACE noted that no further action is needed if the NED Plan is recommended. If the Sponsor seeks an LPP, it may qualify for a categorical exception (see paragraph 3-3b(11), ER 1105-2-100) if the LPP is smaller than the NED Plan. CENWD noted that LPP's are not unusual and are often due to affordability. HQUSACE stated that if and when the Sponsor decides it wants an LPP, the Sponsor's request should be coordinated with CENWD and CECW-NWD to confirm the appropriate procedure.

Required Action. No further action is necessary if the NED Plan is recommended. If the Sponsor decides to pursue a different plan, then the District should coordinate the Sponsor's request with CENWD and CECW-NWD to confirm the appropriate procedure.

Action Taken. The NED plan is the recommended plan.

HQUSACE Final Assessment. This issue is resolved.

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25. <u>Argentine Levee Unit Modifications – Pump Station Modifications Analysis</u>. The recommended plan includes $12 million of modifications for pump stations. It is not clear whether these changes would reduce the ponding and interior drainage damages or would simply maintain the original level of protection when the levee is raised. If the level of protection would improve, then the benefits may involve changes in ponding and interior flooding along with changes in flood-fighting costs for very infrequent events. In this situation, the pump station modifications should be incrementally justified based on reducing the damages using the procedures for evaluating major rehabilitation at projects presented in Appendix E, Section X of ER 1105-2-100 and EP 1130-2-500.

District Response. The pumping capacity of the existing stations is adequate and would not be appreciably increased by the recommended modifications.

Discussion/Required Action/Action Taken. No further action is needed.

HQUSACE Final Assessment. This issue is resolved.

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26. <u>Argentine Levee Unit Modifications – Privately-Owned Pump Stations</u>. Page 6 of the AFB Documentation Listing states that the proposed improvements for the Argentine Unit may adversely impact privately owned pump stations used to reduce flooding from interior drainage during flood events. Based on the description it appears that replacing or incorporating these facilities into the Federal project would not be economically justified. What is the basis for concluding that no design deficiency exists in this situation? Have District real estate and counsel confirmed that we would not be obligated to mitigate for the impacts on these pump stations or the flooded properties? Have we advised the respective owners of the potential impacts on their facilities? How/when? The proposal to use the costs of additional portable pumps in lieu of estimating pump station modifications appears conservative and reasonable. Are the owners responsible for the costs? It appears that these would be a subcategory of Other Direct Costs that includes uncompensated NED losses. Answers to these questions are needed to help ensure that the recommended plan includes the appropriate facilities and that the costs are apportioned appropriately. Note that under current criteria, minimum facilities for interior flood damage control should be included (see EM 1110-2-1413). Any further interior flood control requires justification.

District Response. The area drained by private pumps was designated for ponding in the constructed project design. The property owner elected to curtail frequent ponding on this area by installing pumps. Whatever response is appropriate, the condition is not a design deficiency because the pumps are not part of the authorized project design. We recognize that the private investment in pumps will not be as effective pumping over a taller levee. With portable temporary pumping available as a ready and adaptable remedy, we see no value added in further investigating the institutional relationship of these pumps to the authorized project. We are considering whether the occasional cost of portable pumps should be an uncompensated NED loss, an added O&M cost, or a mitigation requirement and will discuss our recommended option at the AFB.

Discussion. The District indicated that the private pumps have no legal rights and therefore any increased pump facility or operation costs are not compensable. HQUSACE concurred that a design deficiency is not apparent and did not see a rationale for assigning the increased costs to the project OMRR&R. The NED impact, if measurable and significant enough, would be included in the NED analysis as an "*other direct cost*" (see paragraph 2.12.7(c) of Principles and Guidelines). HQUSACE recommended that the District real estate and counsel confirm that there is no need to mitigate the owner's increased costs, and for the draft report to summarize the analyses and determination.

Required Action. Present the determination and supporting analyses in the draft report regarding the need, or lack thereof, to mitigate increases in the owner's pump facility costs.

Action Taken. Two privately owned pump station discharge lines that currently run up and over the levee would be affected by the levee raise. Both lines will need to be elevated further to accommodate the raise. It has been determined that the increase in elevation of the discharge lines will not affect the pumping capacity such that large cost increases will be incurred by the private pump plant owners. It was also determined that the owners of the pump stations own no Real Estate interests over the lands on which the pump discharge lines are located, and are not entitled to just compensation. Because these are not public facilities, there is no requirement to provide a substitute facility. This information is provided in the draft Real Estate Plan in Section 16 entitled Description of Facility / Utility Relocations.

HQUSACE Final Assessment. This issue is resolved.

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27. Argentine Levee Unit Modifications – Induced Flood Damages. Page 31 of the Planning Narrative and the supporting table indicate that raising the Argentine levee unit would raise flood elevations 0.4 foot in other levee locations for the 0.2 percent flood. The annual equivalent induced flood damages would range from $229,000 to $247,000 depending on the height of the levee raise. The narrative further states that the events that would cause induced damages are rare and that no reasonable mitigation plan is thought possible at this time. It also states that potential raises of the Armourdale and CID levee units, to be addressed in future Phase 2 studies, would eliminate the induced damages. Page 6 of the AFB Documentation Listing provides similar information. The decision to not mitigate for induced damages should also be based on whether a real estate "taking" would occur as defined by the Fifth Amendment and case law. If mitigation still does not appear warranted, then the draft report will need to present the rationale and criteria as to why the additional expenditure is or is not appropriate from a social, safety, equity, and etc standpoint. If mitigation is necessary, then the report needs to document the determination of the appropriate mitigation plan and include the appropriate mitigation measures in the recommended plan. Deferring mitigation to potential future studies and construction is not valid. In fact, deferring the solution infers that the recommended plan is incomplete. OMB recently returned a final report as incomplete in a nearly identical situation. If modifying the Armourdale and/or CID Units would offset the induced damages from the Argentine Unit in a relatively cost effective manner, then the various units may not be separable and improvements may have to be implemented simultaneously for all three units. Further explanation is needed on deferring the study of the Armourdale and CID Units in light of the potential induced flood damages. See paragraph 3-3b(5) of ER 1105-2-100.

District Response. The guidance in ER 1105-2-100 advises that mitigation should be investigated and recommended, if appropriate. We are investigating the determination of a real

estate taking in conjunction with the Argentine levee raise. Aside from that pending determination, mitigation may not be appropriate. Key consideration include the rare circumstances necessary for induced flood damage, the fact that the induced stage only occurs following severe uninduced flooding, and the existing authority to address inadequacies in all the levee units of the Kansas Citys system. Even if the justification for induced damage mitigation should prove compelling, the concept that the units would be implemented simultaneously is suspect. With the adoption of the two-phased study of the levee system we have accepted that the system will be studied and upgraded programmatically in recognition of both Federal and non-Federal fiscal constraints. Implementation of activities recommended in either Phase I or Phase II will be contingent on the availability of both the Federal and non-Federal funds to implement. Imposing a requirement that any two units must be implemented simultaneously because a minor hydraulic interrelationship renders them "not separable" would needlessly disregard the programming and management challenges inherent in any enterprise with the size and complexity of the Kansas Citys local protection project.

Discussion. The District presented a paper on the induced flooding investigations. Areas upstream and opposite the Argentine Unit are only affected by very large floods (~0.33% +) when they are already fully inundated 6 to 8 feet. Less than 0.2 feet additional flood depth is induced. A similar situation exists downstream, except the added depth is less than 0.5 feet. The total average annual induced damages are on the order of $250,000. The District stated that a real estate "taking" would not occur and mitigation is not appropriate. HQUSACE noted that if mitigation becomes necessary, it can not be deferred to Phase II; i.e., Phase I needs to meet the P&G criteria for completeness. The District noted a potential issue of Environmental Justice at the Armourdale Unit is being coordinated with EPA and will be fully documented in the EIS along with the induced flooding. The HQUSACE stated that the results of the induced flooding analyses should be summarized in the draft report.

Required Action. The draft report should present the results of the induced flooding analyses, including the real estate and any other analyses supporting the determination that mitigation is not needed.

Action Taken. District legal review based upon statutes and case law has indicated that there is no basis for the finding of a real estate taking under these circumstances.

Induced damages are discussed in the "Induced Damages" paragraph of the draft report in the section entitled *Environmental and Cultural Aspects of the Recommended Plan* under the heading Description of the Recommended Plan. It is discussed in the draft report paragraph under the heading Interim Report Conclusions. A discussion of induced damages is also presented in paragraph 4.3.3.1 of the Economics Appendix. The draft Real Estate Plan covers this issue in Section 9, Discussion of Induced Damages, and it is also discussed in section 4.16.10 of the draft EIS.

HQUSACE Assessment. The estimated average annual induced damages ($207,000) should be presented on page 61 so that readers (decision-makers) do not need to hunt through Appendix A to identify it.

District Response/HQUSACE Assessment/Required Action. Revise the main report to present average annual induced damages.

Action Taken. Estimated average annual induced damages resulting from the proposed Argentine raise is shown in the last paragraph of page 64 of the final main report.

HQUSACE Final Assessment. This issue is resolved.

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28. <u>Argentine Levee Unit Modifications – Environmental Mitigation</u>. What is the environmental mitigation mentioned in paragraph e(1) on page 4 of the AFB Documentation Listing? Is it included in the cost estimate for the Argentine Unit alternatives? Any environmental mitigation should be evaluated in accordance with paragraph C-3e of ER 1105-2-100.

District Response. Concur. This will be addressed in the report.

Discussion. In order to understand and endorse the tentatively selected plan, HQUSACE should understand the need for and the scope and nature of the proposed ecosystem mitigation. The District presented information on the ecosystem mitigation that demonstrated the minor extent of mitigation (0.04 acre).

Required Action. Address the mitigation needs, goals, plans and justification in the draft report.

Action Taken. Mitigation is addressed in the "Mitigation" paragraphs of the main report in the section entitled *Environmental and Cultural Aspects of the Recommended Plan.* It is also covered in Section 4.1.1 of the draft EIS.

HQUSACE Assessment. Section 4.11 of the EIS discusses the wetland impacts of the proposed project and resultant mitigation needs. This section also states that the USFWS draft FWCA report has recommended that the impacted wetlands be mitigated at a 1.5:1 ratio. Recommendation 5 of the September 2005 USFWS report states only that farmed wetlands should be replaced at a 1:1 ratio. Please correct the apparent error in the citation of the USFWS report.

With regard to the determination of mitigation needs, paragraph C-3(d)5 of ER 1105-2-100 states that mitigation needs should be determined using habitat-based evaluations to the extent practicable. Paragraph C-3(e)8 of the same ER also requires that cost-effectiveness/ incremental analysis be completed for all mitigation plans. Obviously, completing a habitat-based evaluation and CE/ICA does not make sense for the very small wetland impacts associated with this project, and HQUSACE encourages the District to use alternative means to determine the mitigation need and resultant mitigation plan, as needed.

HQUSACE recommends that the final report/EIS include an analysis of the significance of the wetland losses caused by the plan. Should the District determine that the losses are significant, a concept mitigation plan should be described in the final report/EIS. However, if the wetland losses are determined to be insignificant (i.e., not great enough to require compensatory mitigation), the report/EIS should include a brief discussion of why compensatory mitigation is not warranted. The report and EIS contain a good discussion of the avoidance and minimization measures used during the planning process, and it is clear that steps were taken to avoid damage to valuable natural areas, where practicable.

District Response. The small wetlands impacted by the proposed Argentine levee raise are discussed in the draft EIS, page 74, section 4.11.1 and the Draft EIS appendix H, page 7, first paragraph. A habitat-based evaluation of these wetlands is not warranted in this case as they are of limited function and low value based on their small size and monotypic plant communities. Currently, Item c. on page 9 of Appendix H provides a brief overview of the proposed wetland creation.

Page 10 of the draft Fish and Wildlife Coordination Act Report (DCAR) dated September 28, 2005 recommends a concurrent creation mitigation ratio of 1.5:1 for emergent wetlands. The replacement of the impacted wetlands is in accordance with paragraph C-3e(7) of ER 1105-2-100 which states that "*District Commanders shall ensure that adverse impacts to wetland resources are fully mitigated. Mitigation shall be accomplished through appropriate actions taken to avoid, minimize, and compensate for unavoidable losses as required to clearly demonstrate efforts made to meet the administration's goal of no net loss of wetlands.*" In the "Recommendations" section of the DCAR, the USFWS states in item 1 in regards to riparian and wetland impacts, "*...compensatory mitigation should be undertaken for unavoidable impacts.*"

The District has completed an analysis of the mitigation requirements commensurate with the quality and quantity of the habitat affected by the project. A concept mitigation plan will be included in the final EIS. In this situation, given the low quality and limited value of the impacted wetlands, our mitigation approach is to comply with the governing regulations, Executive Order 11990, USFW guidance, and basic environmental stewardship as mandated by the EOPs, while recommending the least cost mitigation alternative.

HQUSACE Assessment/Required Action. Present the response information in the final report.

Action Taken. Based on the concepts within Executive Order 11990, the FWCAR recommendations, and the Corps' Environmental Operating Principles; the wetlands impacted by modification of the levee within the Argentine Unit were considered to constitute a value to wildlife in the habitat limited environment of the industrial area and mitigation to result in no net loss of wetland habitat to the area. The conceptual mitigation plan was added to the Final EIS in Section 4.11.10, page 91.

HQUSACE Final Assessment. This issue is resolved.

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29. <u>Argentine Levee Unit Modifications – Contaminated Soil Removal</u>. Explain the contaminated soil removal mentioned in paragraph e(2) on page 4 of the AFB Documentation Listing? How is it included in the cost estimate for the Argentine Unit alternatives? The report should address how the material is characterized in accordance with paragraphs 2-4p and q of ER 1105-2-100 and ER 1165-2-132. Is this the same work as the environmental mitigation mentioned above?

District Response. Concur. This will be addressed in the report.

Discussion. Similar to the previous concern, HQUSACE needs to understand the scope and nature of the contaminated soil problem, and who is responsible for correcting it. The District summarized the nature and extent of the problem and indicated the contamination involves petroleum products, not HTRW. The clean-up would be a project responsibility.

Required Action. Include the "discussion" information in the draft report.

Action Taken. This is addressed in the draft report, in the paragraphs under "*Hazardous, Toxic and Radioactive Waste (HTRW) Sites*" in the section entitled *Overview of Existing Environmental and Cultural Resources*. For the recommended plan it is addressed in the section entitled *Measures Taken within the Recommended Plan Contaminated Areas* under the heading <u>Description of the Recommended Plan</u>.

HQUSACE Final Assessment. This issue is resolved.

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30. <u>Other Formulation and Evaluation Concerns – Economic Analyses and Plan Selection</u>. The economic analysis documentation is inadequate to support a determination that it and the resulting plan selection comply with policy. The information provided does not

adequately describe the procedures used or the results of major steps. The benefits and net benefits are not displayed for the various alternatives for each of the levee units, only for the selected plans. The impacts for each competing alternative should be displayed in order to support the plan comparison and selection. See paragraph 2-3e of ER 1105-2-100.

District Response. The analyses of the with and without project conditions included risk and uncertainty analyses (HEC-FDA) and were conducted in accordance with requirements of ER 1105-2-100 and other pertinent guidance. Exhibit E, "Alternative Screening Summary, Phase 1 Units," displays the project first costs, project economic costs, total annual costs, total annual benefits, net benefits and residual damages for each of the alternatives analyzed for each of the Units. The overall recommended plan for the Phase 1 units is also shown.

Discussion/Required Action. The information in Exhibit E indicates the plan selection is appropriate. Include the information from Exhibit E in the draft report.

Action Taken. The screening of alternatives and selection of the recommended plan are detailed in the tables and text contained in the draft Economics Appendix in Sections 4.4 through 4.7, and in Section 5.0.

HQUSACE Final Assessment. This issue is resolved.

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31. <u>Other Formulation and Evaluation Concerns – Incremental Analyses</u>. With the exception of the proposed levee raise, each of the various recommended features should be incrementally justified in a manner similar to that used for major rehabilitation of Federal projects in accordance with Appendix E, Section X of ER 1105-2-100 and Chapter 3 of EP 1130-2-500. The analyses would need to address the probability of a component/element not performing properly (e.g. failing), consequences of that failure (physical and fiscal), and consideration of what actions would be taken after the failure occurred and how that affects the likelihood of failure again in the future.

District Response. Exhibit F, "Argentine Unit, Incremental Analysis of Levee Raise," Exhibit G, "Fairfax-Jersey Creek Incremental Analysis of Separable Features" and Exhibit H "North Kansas City Unit," show traditional incremental justification analyses of the discrete features identified for each of the Phase I levees. This traditional incremental analysis is appropriate because the recommended features are considered to have essentially zero chance of failure within the period of analysis.

Discussion/Required Action. Include the information from the various exhibits in the draft report.

Action Taken. The incremental analyses for each of the levee units are found in the draft Economics Appendix, in Sections 6.1 through 6.3.

HQUSACE Final Assessment. This issue is resolved.

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32. **Other Formulation and Evaluation Concerns – OMRR&R Costs.** Page 33 indicates that OMRR&R costs were inflated to the year of expenditure before being converted to an annual cost. This does not appear to be consistent with the constant dollar approach used in Corps planning and should be revised. See paragraph 2-4i of ER 1105-2-100.

District Response. Concur. This was also discussed with the independent reviewer. The OMRR&R costs have been estimated for each year at current prices, no inflation. OMRR&R costs are lower with this revision.

Discussion/Required Action. Include the revised OMRR&R cost estimate in the draft report.

Action Taken. The OMRR&R is discussed in the draft report in the paragraphs under "Cost for Operations, Maintenance, Repair, Rehabilitation, & Replacement", in the section entitled *Economic Evaluation of Alternatives*. It is also covered in Section 4.3.2, Tables 34 and 49 of the draft Economics Appendix. Appropriate increases in costs for OMRR&R are included in the cost estimates the recommended plan.

HQUSACE Final Assessment. This issue is resolved.

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33. **Other Formulation and Evaluation Concerns – Future Work.** Future OMRR&R needs are normally affected by project improvements and should be accounted for in the economic analyses. Provide the with- and without-project forecasts for likely future repair, rehabilitation, and replacement actions necessary for keeping the project fully operational for the 50-year period of analysis. There should be some correlation between the age of the features and the need for repair, rehabilitation, or replacement. Identify instances where scheduled future repair, rehabilitation, and replacement actions would be delayed or reduced by the proposed work and identify how this is addressed in the economic analyses. Identify the impacts on future O&M needs and costs (see below).

District Response. With the exception of the Argentine pumping facilities, the remedies identified for the Phase I units do not affect existing facilities. These remedies have negligible potential to impact O&M of existing facilities. O&M of the existing units has been underway for more that 50 years and provides a reliable basis to extrapolate the future O&M estimate used in

the current analyses. We will examine and report on the O&M impacts, if any, of the Argentine pump station improvements.

Discussion. HQUSACE expected the proposed deficiency corrections and/or reconstruction work to reduce the needs for some future replacement, repair and rehabilitation costs. The District indicated that this was unlikely since there is no schedule of replacement, repair and rehabilitation efforts. HQUSACE said the draft report needs to document this aspect in the presentation of the future without-project condition.

Required Action. Document the future without-project needs for repair, rehabilitation, or replacement in the draft report.

Action Taken. Table 17 in the draft report in the Section entitled *Operation and Maintenance Associated with the Recommended Plan*, and associated text, addresses this question.

HQUSACE Final Assessment. This issue is resolved.

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34. <u>Other Formulation and Evaluation Concerns – Future OMRR&R Costs</u>. Describe the estimated annual OMRR&R costs in greater detail for the 50-year period of analysis. It is not clear that the analysis captures the true incremental expenses for OMRR&R between the with– and without–project conditions. The estimated OMRR&R costs appear to be too low for all four levee units, especially considering the large numbers of relief wells. What will be frequency and costs of cleaning and testing the relief wells? Paragraph E-5d on page E-17 of ER 1105-2-100 requires that the life cycle costs including OMRR&R be accounted for in the development of project cost estimates. Additional information is needed to assure that the future OMRR&R requirements have been adequately accounted for in the economic analysis and that the sponsors are provided with a sound basis to do financial planning for the total project.

District Response. The analyses includes only the new additional OMRR&R costs that the sponsors would be expected to incur based on the new proposed unit modifications. The analysis considered and accounted for the new additional OMRR&R in each year of occurrence, and then computed a present worth value of the future OMRR&R costs. (Recent revisions removed inflation factors per Comment f(3) above, and the costs are at October 2004 price levels.) The present-worth value was then annualized using the current Federal Interest Rate of 5.375% and a 50-year period of analysis. The Kansas Citys Units are well-maintained levee and floodwall units and the Sponsors comply with annual inspection requirements. The OMRR&R costs that the Sponsors currently typically incur for the existing project in each unit will continue. For example, existing relief wells will continue to be maintained by the Sponsor. With new pump plants or pump plant modifications, although typical OMRR&R costs would

likely be reduced, we assumed the Sponsor would continue to incur costs similar to the costs they incur to maintain the existing pump plants. Following is a description of the assumptions we used in determining the new additional OMRR&R costs that the Sponsors would be responsible for with each alternative.

New Relief Wells: Each new well is assumed to be maintained every 4 years at an estimated cost of $5000 per well. New wells are assumed to be replaced after 40 years; the replacement cost includes 10% E&D and 7% S&A. The Sponsor would continue to incur costs for any existing relief wells but these costs are ongoing for the current project and are not included in the analysis of the proposed project.

New Buried Collector System: Assumes buried collector pipe is flushed every 25 years; assumes 2-man crew, approximately 3 days, plus equipment cost.

New Pump Plant: Assumes pumps in new pump plant will be serviced every 10 years.

Discussion. Consistent with the response, the NED analyses of the proposed project modifications should only include the incremental changes in OMRR&R. However, the report should also disclose the resulting total estimated OMRR&R costs for the entire project with the recommended modifications.

Required Action. Include the incremental and total OMRR&R costs for the modified project in the draft report.

Action Taken. The OMRR&R is discussed in the draft report in the paragraphs under "Cost for Operations, Maintenance, Repair, Rehabilitation, & Replacement", in the section entitled *Economic Evaluation of Alternatives*, and in Table 17 in the draft report in the section entitled *Operation and Maintenance Associated with the Recommended Plan*, and associated text. It is also covered in Section 4.3.2, Tables 34 and 49 of the draft Economics Appendix. Appropriate increases in costs for OMRR&R are included in the cost estimates of the recommended plan.

HQUSACE Final Assessment. This issue is resolved.

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35. <u>Other Formulation and Evaluation Concerns – Residual Damages</u>. What are the residual damages with and without the various alternatives? See paragraph 3-3b(4) of ER 1105-2-100.

District Response. Residual damages are displayed on Exhibit E, Alternatives Screening Summary, Phase 1 Units.

Discussion/Required Action. Include the Exhibit E information in the draft report.

Action Taken. Residual damages are discussed in the draft Economics Appendix in Section 4.2 and displayed in Tables 30 through 32, and Table 39.

HQUSACE Assessment. The estimated residual damages for each of the sites should be presented in the "*Recommended Plan - Accomplishments*" section of the main report as both dollars and a percentage of the future without-project damages.

District Response/HQUSACE Assessment/Required Action. Revise the main report to present residual damages.

Action Taken. Residual damages (and shown as a % of Future Without Project damages) for the recommended plan and separable elements in each of the Phase 1 Units are shown in revised Table 20 (replacement page 73 herein) of the final main report.

HQUSACE Final Assessment. This issue is resolved.

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36. <u>Other Formulation and Evaluation Concerns – Summary Costs and Benefits</u>. There is no summary of the benefits and costs of the recommended plan. What are the total first costs, average annual costs, annual OMRR&R, average annual benefits, and average annual net benefits for the complete tentatively selected plan? See paragraphs D-2h and D-3j of ER 1105-2-100. The designation of selected plans is not consistent from one exhibit to another. The beneficial and adverse affects of plans must be compared per paragraphs 2-3d and e of ER 1105-2-100 to support the plan selection.

District Response. The overall recommended plan for the Phase 1 Units is displayed on Exhibit E, "Alternatives Screening Summary, Phase 1 Units."

Discussion/Required Action. Include the Exhibit E information in the draft report.

Action Taken. The requested material can be found in the draft report in Table 18 in the section entitled *Recommended Plan Accomplishments*, and in the draft Economics Appendix in Table 53.

HQUSACE Assessment. A cost estimate display for each of the sites should present estimates for each pertinent Code of Accounts item, including PED, LERRD, construction, and OMRR&R costs in accordance with item 3b(2) in Exhibit G-5, ER 1105-2-100. An example of the table format normally used to display these estimates is shown in Table 1, Appendix B, EC

1105-2-405. Contingency costs and IDC should also be identified. These tables, which will also appear in the Project Summary accompanying the final report, are used to assess the relative levels of investment in the key project features.

District Response/HQUSACE Assessment/Required Action. Revise the main feasibility report by adding table displaying project costs by code of accounts. Revise Table 18 in the main feasibility report to display estimates of annual benefits and costs per example Tables 1 and 2A in Appendix B, EC 1105-2-405. Include these tables in the Project Summary.

Action Taken. Table 18, on page 63 of the final main report, displays the cost for the total overall recommended plan and for all sites in the recommended plan by Code of Accounts (including PED, LERRD, construction, and contingency costs). Table 19 on page 71 of the final main report displays the current average annual OMRR&R costs for each Local Sponsor and the incremental increase in annual OMRR&R cost for the recommended plans in each levee district. Table 20 (replacement page 73 herein) of the final main report displays Interest During Construction, Total Investment Cost and the incremental increase in OMRR&R costs for the recommended plan in each Phase 1 Unit, for the overall recommended plan, and for the separable elements in the Fairfax-Jersey Creek and North Kansas City Units. As now shown in the revised Table 20, all benefits are flood damage reduction benefits, and benefit-cost ratios are shown at the FY06 Federal Interest rate (5.125%) and at the 7% rate.

HQUSACE Final Assessment. This issue is resolved.

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37. **Other Formulation and Evaluation Concerns – Project Life.** The last line on page 32 of the Planning Narrative mentions a "50-year life." This infers a limited project life, which could have adverse budgetary connotations. A project life only ends when Congress specifically deauthorizes the project. Replace the phrase with "50-year period of analysis." See paragraph 2-4j of ER 1105-2-100.

District Response. Concur. Report language and future references will be "50-year period of analysis."

Discussion/Required Action. Replace all references in the draft report to a "50-year life" with "50-year period of analysis."

Action Taken. The search and replace function was used for the draft report, and this language is used in the draft Economics Appendix.

HQUSACE Final Assessment. This issue is resolved.

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38. <u>Environmental Concerns – Cumulative Impacts</u>. Page 23 of the Planning Narrative and page 9 of the AFB Documentation Listing note that cumulative impacts need to be addressed, however, the plan formulation process appears to be well underway. While the fact that plan formulation has proceeded this far implies that cumulative affects would not be significant, it would be better to just come out and say so, similar to the statement made for Cultural Resources on page 23 of the Planning Narrative. A brief statement/preliminary cumulative affects analysis should have been included in both documents to indicate that the anticipated cumulative affects have been considered in the plan formulation process, but are not expected to be significant. Page 9 of the AFB Documentation touches on this subject, i.e., the "relatively benign impacts" statement, but further exposition is recommended. The Planning Narrative does not contain any indication that cumulative affects were considered in the plan formulation process. How were cumulative affects considered in the plan formulation process?

District Response. Cumulative effects were considered in the plan formulation process following the guidance promulgated in 40 CFR, Chapter V (Part 1500-1599). The analysis of cumulative effects was initiated with the formulation of the proposed alternatives, and the scope of the cumulative impact analysis is related to the magnitude of the potential environmental impacts associated with the proposed action. A draft assessment of cumulative impacts is included in section 5.0 of the draft EIS.

Discussion/Required Action/Action Taken. The response resolves this concern, no further action is required.

HQUSACE Final Assessment. This issue is resolved.

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39. <u>Environmental Concerns – Endangered Species Impacts</u>. A brief preliminary assessment of endangered species impacts should have been included on page 22 of the Planning Narrative. Seven species of concern are listed on the bottom of page 22, but no assessment is provided to indicate that these species have been considered in the plan formulation process. At a minimum, this section should have outlined the process (e.g., ongoing coordination with the USFWS, preparation of a biological assessment, etc.) that would be followed to address endangered and threatened species concerns. What is the preliminary assessment of endangered species impacts and what process will be followed to address endangered and threatened species concerns?

District Response. Coordination with the USFWS has been conducted throughout the planning process regarding the assessment of potential impacts to threatened and endangered species in accordance with Section 7 of the Endangered Species Act, as amended. A planning aid letter (PAL) was requested and received from the USFWS in July 1999. Comments from the

USFWS regarding preliminary project alternatives were received August 2003 in response to the Agency Information and Public meeting conducted for the Kansas Citys Feasibility Study. In accordance with the Fish and Wildlife Coordination Act (FWCA), as amended, draft and final coordination act reports (CARs) were requested from the USFWS in July, 2004. To supplement the information needed by the USFWS for a preliminary assessment of potential impacts to threatened and endangered species, project aerial photography and a narrative consisting of a description of the project, proposed recommended alternatives for each levee unit, and estimated soil quantities needed from the proposed borrow area were provided to the USFWS for analysis in May 2005. The USFWS is currently working on the draft CAR (DCAR). The DCAR will be completed in FY06. The preliminary assessment of threatened and endangered species impacts as a result of the proposed project is that no threatened or endangered species will be impacted by the proposed project. The agency coordination process to address threatened and endangered species concerns has been followed since 1999.

Discussion/Required Action. Include the information in the response in the DEIS.

Action Taken. Threatened and endangered species are addressed in section 4.14 of the EIS. A general remark is in the draft report in the Syllabus. A discussion is included in the section entitled *Overview of Existing Environmental and Cultural Resources*, in the paragraphs under "Threatened or Endangered Species".

HQUSACE Final Assessment. This issue is resolved.

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40. <u>ITR Documentation</u>. The 22 April 2005 CENWK e-mail, subject: AFB KC Levees -- ITR significant and important comments/status, states that the ITR is mostly complete with some wrap-up efforts remaining. This implies that ITR, and probably policy and legal reviews, will not be performed on the draft and final feasibility reports contrary to paragraphs H-2d(1), H-2d(2), H-2f, and H-4c of ER 1105-2-100. Will the District perform technical, policy and legal reviews of the draft and final reports? Explain what will be done.

District Response. ITR of the Feasibility Study products is an onboard review that began near the initiation of the Feasibility Study and will continue through plan selection. In preparing for the AFB, we provided a description of the completeness of ITR of the products submitted as part of the AFB package. Exhibit G-5 of ER1105-2-100 indicates that the AFB package should include a description of the status of ITR, but does not require certifications of ITR or other reviews as would be required to obtain Feasibility Report approval. Certification of technical, policy and legal reviews will be applied at appropriate points in Feasibility Report processing in accordance with the ER.

CECW-PC (10-1-7a) 13 December 2006
Subject: Argentine, East Bottoms, Fairfax-Jersey Creek, and North Kansas City Levee Units, Missouri River and Tributaries at Kansas Cities, Missouri and Kansas - Policy Compliance Review Record

Discussion. HQUSACE asked and CENWK/CELRL confirmed that the ITR documentation will include review team concurrence with the required actions, and that the ITR and legal review will continue thorough the development and completion of the final report.

Required Action/Action Taken. No additional action is necessary.

HQUSACE Final Assessment. This issue is resolved.

Clifford L. Fitzsimmons, P.E.
Policy Compliance Review Manager