In the United States Court of Federal Claims

No. 97-821 L
(Filed: May 26, 2004)

HENDERSON COUNTY DRAINAGE DISTRICT NO. 3, ET AL.,	)	
Plaintiffs,	)	Trial; Takings; Excess Seepage; Gravity Drainage; Levee Erosion; Claim Accrual; Statute of Limitations
v.	)	
THE UNITED STATES,	)	
Defendant.	)	

Gary H. Baise, Washington, DC, for plaintiff. Alexander M. Bullock and Gary L. Lotridge, Washington, DC, of counsel.

William J. Shapiro,[1] with whom was Julia Evans, Assistant Attorney General, Environment and Natural Resources Division, United States Department of Justice, Washington, DC, for defendant. Rian Hancks, United States Army Corps of Engineers, Office of Counsel, Rock Island District, of counsel.

OPINION AND ORDER

HEWITT, Judge

This action involves claims on theories of breach of contract and takings brought by drainage districts and riparian landowners along the Upper Mississippi River in Illinois and Missouri against the United States Army Corps of Engineers (Corps) arising out of the Corps' operation and maintenance of a nine-foot navigation channel (Navigation Project or nine-foot channel).

[1]The attorney of record at the time of trial, Mr. Alan Brenner, retired from the Environment and Natural Resources Division of the United States Department of Justice on March 31, 2004.

By Orders dated April 20, 2000, see Order of Apr. 20, 2000, at 1 (directing the parties to identify two drainage districts and the individual landowners as lead case plaintiffs), and January 8, 2004, see Order of Jan. 8, 2004, at 6 (dismissing the claims of Courtney and Robert Munson), and with the concurrence of the parties, see Plaintiffs' Response in Compliance with the Order of July 7, 2000 Identifying Parcels of Land Subject to Takings Claims by Parties Remaining in the Lawsuit (identifying the plaintiff-landowners and their respective lands); Parties' Joint Statement of the Issues to be Presented on Cross Motions for Summary Judgment (identifying issues related only to Henderson County Drainage District No. 3, Marion County Drainage District and landowners in Henderson County Drainage District No. 3), this litigation now addresses the claims of two drainage districts, Henderson County Drainage District No. 3 (HCDD3) in Illinois and Marion County Drainage District (MCDD) in Missouri, and the following landowners in HCDD3: the Estate of Glen J. Romkey, Mr. Howard Pruett and Mr. and Mrs. John Robb. HCDD3 borders Pool 18 of the Navigation Project. Plaintiffs' Post-Trial Brief (Pls.' Br.) at 2. MCDD borders Pool 22 of the Navigation Project. Id. Pool 18 is the geographic area of the Mississippi River extending from dam 18 upstream to the next dam, dam 17. Transcript of Trial held on Jan. 20-30, 2004 (Tr.) at 2135:19-23 (testimony of Mr. Kevin Landwehr). Pool 22 is the geographic area of the Mississippi River extending from dam 22 upstream to dam 21. Tr. at 2135:24-2136:1 (testimony of Mr. Landwehr).

I. Background[2]

The Nine-Foot Navigation Project (Navigation Project) was constructed by the United States Army Corps of Engineers in the mid-1930s. Henderson County Drainage Dist. No. 3 v. United States, 53 Fed. Cl. 48, 51 (2002) (Henderson I). To support commercial river traffic, the Corps maintains a minimum nine-foot channel depth along the length of the Upper Mississippi River, from Minneapolis, Minnesota to St. Louis, Missouri, using various locks and dams to control a series of pool levels. Id.; Tr. at 2134:24-2135:2 (testimony of Mr. Landwehr). Lock and Dam 18, adjacent to HCDD3, was placed in operation in 1937. Henderson I, 53 Fed. Cl. at 51 n.6. Lock and Dam 22, adjacent to MCDD, was placed into operation in 1938. Id. at 51 n.7. The lock and dam

[2]A full recitation of the background facts of this case was published in this court's opinion, Henderson County Drainage Dist. No. 3 v. United States, 53 Fed. Cl. 48, 50-51, 58 (2002) (Henderson I) (holding that plaintiffs' contract claims were time-barred); see also Henderson County Drainage Dist. No. 3 v. United States, 55 Fed. Cl. 334, 343 (2003) (Henderson II) (denying defendant's and plaintiffs' motions for partial summary judgment with respect to plaintiffs' takings claim). The court sets forth a summary recitation of the facts here and presents additional factual findings as relevant in the sections that follow.

system maintains the nine-foot navigation channel under low to moderate water flow conditions. Tr. at 2135:3-5 (testimony of Mr. Landwehr). "Each dam creates one of a series of 'steps' which river vessels climb or descend as they travel upstream or downstream. Each dam controls the level of its pool and the locks lift or lower vessels from one pool to the next." Joint Exhibit (JX) 43 at JA0309 (U.S. Army Corps of Eng'rs, Master Water Control Manual, Lock & Dam No. 19 (1996)). During high water flow conditions and during flood events, the lock and dam controls are taken out of operation, and the river runs in its natural state. Tr. at 2135:5-9, 15-17.

From the late 1930s until the 1950s, the United States made annual payments to fifteen drainage districts, including HCDD3 and MCDD, for additional pumping costs incurred by the drainage districts due to the high river stages caused by the Navigation Project. Henderson I, 53 Fed. Cl. at 51. In a 1955 report to Congress, known as House Document 135, H.R. Doc. No. 84-135 (1955), JX 14, the Secretary of the Army recommended rectification payments to each affected drainage district. Henderson I, 53 Fed. Cl. at 51. Congress, in response, authorized payments to the drainage districts in exchange for releases waiving future claims arising out of the operation and maintenance of the Navigation Project. Id. In 1961, various drainage districts, including HCDD3 and MCDD, executed releases.[3] Id.

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[3]The releases executed by HCDD3 and MCDD state:

> "WHEREAS, The Congress of the United States, by an Act approved July 3, 1958 . . . has authorized the rectification of damages to certain levee and drainage districts caused by the execution of a project on the Mississippi River . . . to provide a navigation channel nine feet deep and of adequate width for navigation by the construction of twenty-six locks and dams of low heads supplemented by channel dredging (hereinafter referred to as 'the nine-foot channel project'), and
>
> WHEREAS, The Act approved July 3, 1958 provides that said rectification of damages shall be undertaken in accordance with the plans and subject to the conditions in House Document Numbered 135, Eighty-fourth Congress, First Session, and
>
> WHEREAS, the said House Document Numbered 135 provides that a payment of [sum certain] may be made to [the particular drainage district] in full settlement for all damages heretofore or hereafter sustained by said district from the execution of the nine-foot channel project, upon presentation of such evidence, certificates, receipts, releases, and assurances as the Chief of Engineers may consider reasonable and necessary, and

In 1995, fifteen drainage districts and six individual landowners filed suit.[4] Id. The court dismissed plaintiffs' contract claims on cross-motions for summary judgment, id. at 50, and denied defendant's and plaintiffs' motions for partial summary judgment with respect to plaintiffs' takings claims on the ground that "[p]laintiffs may be shown in further proceedings to have been 'justifiably uncertain' with respect to their takings claim until the Corps asserted a flowage easement in 199[4]." Henderson County Drainage Dist. No. 3 v. United States, 55 Fed. Cl. 334, 341, 343 (2003) (Henderson II) (quoting Banks v. United States, 314 F.3d 1304, 1309 (Fed. Cir.), cert. denied, 124 S. Ct. 486 (2003)). An eight-day trial was held on plaintiffs' takings claim in Monmouth, Illinois. The court heard the testimony of twenty witnesses and received over ninety-five documents.

At trial on their takings claims, plaintiffs argued that, as a result of more than sixty years of operation of the Navigation Project by the Corps, excess seepage from the Mississippi River has triggered additional pumping costs within the drainage districts, gravity drain operations in the drainage districts are ineffective and the mainstem levee in Henderson County has severely eroded. Pls.' Br. at 16, 22-23. Plaintiffs also argued that

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> WHEREAS, The Congress has appropriated Federal funds for said payment;
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> NOW THEREFORE, in consideration of the sum [certain] in hand paid by the United States, receipt of which is hereby acknowledged, [the particular drainage district] does hereby release and forever discharge the United States . . . from any and all damages and claims for damages, past, present, and future, that said district may have or claim to have, arising out of, resulting from, or caused by the execution, construction, operation, or maintenance of the nine-foot channel project except for the final annual payment for increased pumping costs for the calendar year 1960.
>
> IN WITNESS WHEREOF, we, the Commissioners of [the particular drainage district] have hereunto subscribed our names for and on behalf of said district this . . . day of . . . 1961."

Henderson I, 53 Fed. Cl. at 53.

[4]Following the voluntary dismissal of four plaintiff drainage districts, see Joint Stipulation for Dismissal of Parties (stipulating to the dismissal of four plaintiff drainage districts), a Corrected Second Amended Complaint was filed on December 4, 2000 by eleven drainage districts and six individual landowners. Corrected Second Amended Complaint at 1, ¶¶ 7-18. The claims of landowners Robert and Courtney Munson were dismissed by Order dated January 8, 2004. Order of Jan. 8, 2004, at 6.

their takings claims were "[i]nherently [u]nknowable [p]rior to 1994" and the factual discovery obtained in the course of this litigation. Id. at 41. Plaintiffs specifically asserted that they "could not have known that they had a takings claim against the Corps for the operation of the Navigation Project" until the Corps asserted in 1994 that it had obtained a flowage easement over the land within HCDD3 and plaintiffs subsequently "discovered" Appendix I, a document referred to in House Document 135 but not printed with the House Document. Id. at 38, 41-42. Appendix I contained the calculations on which the Corps relied in determining the amounts to be paid to the drainage districts as part of the 1961 releases. See Plaintiffs' Exhibit (PX) 112 (containing a copy of Appendix I).

Defendant argued at trial that plaintiffs' takings claims "are [b]arred by the 1961 [r]eleases." Defendant's Post-Trial Memorandum (Def.'s Br.) at 33-46. Defendant also argued that plaintiffs could have filed suit decades ago, id. at 5-12, and that plaintiffs "[f]ailed to [d]emonstrate '[j]ustifiable [u]ncertainty' [a]s to the [e]xistence of a [t]akings [c]laim," id. at 12-15. Defendant further argued that plaintiffs "[f]ailed [t]o [m]eet [t]heir [b]urden of [p]roof of [c]ausation," id. at 15-29, and that plaintiffs asserted "[j]ust [c]ompensation [d]emands [that] [a]re [n]ot [r]ecoverable," id. at 29-33.

II. Discussion

The court examines plaintiffs' takings claims in light of the open fact questions remaining after the parties' motion practice in this case and in light of the evidence presented at trial. The court considers, in turn, the effect of the 1961 releases on plaintiffs' takings claims, the time of accrual of plaintiffs' takings claims and the merits of plaintiffs' takings claims.

A. The Effect of the 1961 Releases on Plaintiffs' Takings Claims

As addressed in the court's prior decision in Henderson II, a release may be interpreted to preclude the later assertion of a takings claim when "circumstance[s] indicat[e] that a release of a taking claim had been contemplated and bargained for." 55 Fed. Cl. at 343 (citing Bistline v. United States, 640 F.2d 1270, 1271-75 (Ct. Cl. 1981) (finding that where lakefront property owners conveyed a flowage easement to the United States in connection with the Corps' construction and operation of a dam project in Northern Idaho, and where the easement contained a release, plaintiff could not recover for a claimed taking) and Dureiko v. United States, 209 F.3d 1345, 1357 (Fed. Cir. 2000) (declining to recognize a release as a bar to a takings or inverse condemnation claim absent a showing that such a release was within the intent of the releasor)).

There was evidence at trial about the intent of both the United States and the releasor-plaintiffs. At trial, Mr. Thomas Crane, who was the assistant district counsel in the Corps's Rock Island Office when he drafted the 1961 releases, Tr. at 468:17-19, testified that the intent of the releases was to "relieve the government of any further legal liability for damages to the drainage districts caused by the [nine]-foot channel project." Tr. at 491:4-7; see also Tr. at 513:25-514:2 (Mr. Crane stating that it was the "intention of the releases . . . to pay for damages due to the Mississippi River [Nine]-Foot Channel Project"); 522:1-3 (same). Mr. Crane testified at length about the circumstances leading to the execution of the releases. He testified that, in his preparation and draft of the releases, he read no other documents but House Document 135. Tr. at 49:9-22. He stated that House Document 135 did not contain the Corps' underlying data on which House Document 135 was based. See Tr. at 49:13-16 (Mr. Crane stating that he did not review the unprinted documents referenced in House Document 135). Stating that "House Document 135 in numerous references refers to a constant dialogue between the government, that is, the Corps of Engineers, and the drainage districts," Tr. at 486:1-4, Mr. Crane testified that "there was a constant dialogue between the government officers preparing this report and the drainage districts and they were talking back and forth all the time," Tr. 178:10-14.

House Document 135 itself states that "[t]he study of costs of maintaining and operating the drainage districts has been carried on for an average period of 10 or 11 years." JX 14 at JA0138; see also id. at JA0127 ("[S]tudies of the effects of the upper Mississippi River navigation pools upon 19 levee and drainage districts [had occurred] over an average period of 10 years."). House Document 135 also states:

> The Board of Engineers for Rivers and Harbors has carefully considered the recommendations of the district and division engineers and additional information submitted by local interests . . . [and] concurs in general with the views . . . as to the nature and amounts of damages to levee and drainage districts caused by the navigation pools within th[e] reach of the Mississippi River [between the Missouri River and Minneapolis, Minnesota, which is the location of the navigation pools affecting the drainage districts in this case].

Id. at JA0126.

Mr. Crane testified that he was "assigned the job of preparing a release to execute a statute enacted by Congress which required specific amount[s] of money to be paid to each district for damages due to the [nine]-foot channel project", Tr. at 68:2-6, and that, as authorized by the 1958 River and Harbor Act, see Tr. at 469:17-24, the payment for

"such damages . . . should be in full settlement of all damages heretofore or hereafter sustained by the districts . . . by the execution of the navigation project," Tr. at 470:23-471:2. Mr. Crane explained that because "[t]he law stated that [the releases] should be in full settlement of all damages heretofore or hereafter sustained by the districts, . . . [he] drafted the broadest, most comprehensive release [he] could draft." Tr. at 471:22-472:1. He stated that he had no "authority to change or modify the amounts in any way. [His] only duty was to prepare the releases in accordance with the statute which incorporated the recommendations of the chief of engineers in House Document 135." Tr. at 69:25-70:4. He also stated that "the[] engineering details [underlying the payment amounts] . . . were not relevant to [his] job of preparing the release." Tr. at 263:1-3.

In response to the court's question whether the words "Fifth Amendment takings clause [were] ever used" in the drafting of the 1961 releases, Mr. Crane testified:

> I think we [the Corps] generally discussed the genesis of this project, which was the initial direct physical invasion of the property required by the law at the time. . . .
>
> We believed that we had foreclosed all just compensation claims by the private landowners by actual direct purchases of the land during the construction of the project; and the only thing remaining to be done were the claims of the drainage districts for these indirect effects.

Tr. at 546:6-21. Mr. Crane testified that "[t]he only two [drainage districts] that [he] can recall that objected [to the payment amounts] were . . . Henderson No. 3 and Marion County." Tr. at 501:2-9.

By letter dated December 8, 1960, the attorney for HCDD3, Mr. Lyman Fort, advised the Corps that "[t]he Commissioners [of the drainage district] . . . [were] somewhat concerned over the terminology used in the release . . . [because] the release, if executed, would release the [g]overnment from maintaining the river lev[ee]." JX 78. Mr. Fort asked the Corps to "redraft[] the release or give . . . confirmation that it is not the intention of the [g]overnment to leave the responsibility of maintaining the lev[ee] to the [drainage] [d]istrict." Id. The Corps did not redraft the release. See Tr. at 503:10-12 (Mr. Crane testifying that there was "[n]o" redrafting of the release). On December 14, 1960, Mr. Crane's supervisor, Mr. Carlton E. Kelley, prepared a handwritten memorandum recording his telephone call to Mr. Fort in response to the letter of December 8, 1960 requesting assurance that the Corps was not leaving the responsibility for levee maintenance in HCDD3 with the drainage district. Tr. at 501:16-17; 505:8-507:22. Mr. Kelley's memorandum stated that "the [Corps] did not now own [and] was

not now obligated to maintain the levee of Henderson No. 3." Defendant's Exhibit (DX) 156. By letter dated December 22, 1960, Mr. Fort informed Mr. Clarke Curtiss of the HCDD3 Board of Commissioners that the Corps has "no ownership or responsibility in regard to the river lev[ee]." DX 157; Tr. at 508:14-24 (Mr. Crane identifying the letter from Mr. Fort to his client, Mr. Curtiss).

After the foregoing interactions, the commissioners of HCDD3 signed and executed the 1961 release. JX 79 (Letter from Mr. Fort to the Corps of 2/21/61 "send[ing] the [signed releases] at once"); DX 163 (Memorandum from Mr. Crane to the United States Comptroller of 2/27/61 directing payment of $43,929 to HCDD3); DX 165 (Letter from the Corps to Mr. Curtiss of 3/2/61 enclosing voucher for final annual payment to HCDD3 in connection with the Corps' operation of the Navigation Project); JX 80 (Release executed by HCDD3 commissioners on 2/23/61). At his 1996 deposition,[5] Mr. Fort testified that the Corps said it would pay HCDD3 "43,000 odd dollars to take care of [HCDD3's] extra pumping expense . . . [caused by the Corps'] rais[ing] the [Mississippi River] channel [in connection with the Navigation Project and] mak[ing] more seepage through the levee which [HCDD3] would have to pump . . . back out." PX 88 at 13:14-23.

With respect to the objections of MCDD, Mr. Crane also testified regarding a discussion he had with the attorney for MCDD, Mr. Myrl B. Sternke, concerning the drainage district's "dissatisf[action] with the settlement." Tr. at 85:21-25. In response to Mr. Sternke's "complain[t] about the size of the damage settlement," Tr. at 88:2-3, Mr. Crane "told [Mr. Sternke] that [the Corps was] bound by the statute," Tr. at 88:3-4.

Mr. Sternke testified that he did not "recall ever negotiating with Mr. Crane" or "even talking to Mr. Crane at any time." Tr. at 96:8-9, 12-13. Mr. Sternke testified that he did recall discussing the Corps' payment of $836 to MCDD with the drainage district commissioners, and he testified that "they didn't think it was adequate but they didn't think they could do anything about it." Tr. at 96:17-97:1. Mr. Sternke also testified that MCDD had a registered engineer who provided engineering expertise to the drainage district. Tr. at 97:7-11. But Mr. Sternke did not know whether the engineer reviewed the 1961 release. Tr. at 97:12-14.

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[5]By Order dated January 15, 2004, the court granted Plaintiffs' Motion for Leave to Admit the Deposition Testimony of Messrs. Fort and Gerst pursuant to paragraph 15(b) of the Appendix A of the Rules of the United States Court of Federal Claims on the ground that both Mr. Fort and Mr. Gerst are deceased. See also Fed. R. Evid. 804(b)(1), (a)(4) (qualifying as a hearsay exception the former testimony of a declarant unavailable "because of death").

The MCDD commissioners signed and executed the release on June 27, 1961. JX 187 (Release executed by MCDD commissioners on 6/27/61); JX 186 (Letter from Mr. Sternke to the Corps of 6/21/61 stating that MCDD would "accept the amount . . . offer[ed] for damages due to the execution of the Mississippi River 9' Channel Project"); JX 189 (Memorandum from Mr. Crane to the United States Comptroller directing payment of $836 to MCDD). Responding to a question about whether the MCDD landowners were made fully aware of the terms and conditions of the release, Mr. Sternke testified that he believed and advised MCDD that the release "was for excess pumping only. . . an excess pumping agreement." Tr. at 117:19-118:6. He further testified that "generally speaking, the [drainage] district is responsible for [levee upkeep and maintenance]." Tr. at 113:22-114:2.

Notwithstanding the execution of the releases, plaintiffs argue, see Plaintiffs' Response to Defendant's Post-Trial Brief (Pls.' Resp. Br.) at 2, 16-19, that they may now assert their takings claims because, by letter dated August 30, 1994, the Corps responded to a request by HCDD3 for assistance with repairs to HCDD3's mainstem levee, stating that the Corps "interpret[s] th[e] [1961] release to include any flowage easements necessary" to permit the Navigation Project to flood HCDD3, PX 22 (Letter from Major General Stanley S. Genega, Corps' Director of Civil Works, to Mr. John Robb, HCDD3 Commissioner of 8/30/94, at 1). Plaintiffs argue that the 1961 releases did not include takings claims because, as Mr. Crane testified, the term "flowage easement" did not appear in either the HCDD3 release or the MCDD release, Tr. at 156:18-157:2, nor were any flowage easements acquired by the 1961 releases, Tr. at 164:22-25. See Pls.' Resp. Br. at 17 (reproducing Mr. Crane's testimony). However, Mr. Crane explained:

> The purchase of land from individually damaged landowners was made by our Real Estate Division during the construction of the project. Actually, flowage easements and land were acquired directly from the landowners.

Tr. at 163:3-7. Mr. Crane's testimony was corroborated by that of Mr. Richard A. Mattson, a thirty-three year realty specialist with the Corps, Tr. at 2239:11; 2240:15-17, who testified that, in connection with the Corps' operation of the Navigation Project, the Corps obtained flowage easements from both HCDD3 and MCDD on the riverward sides of the levees of the drainage districts. Tr. at 2241-52 (HCDD3); Tr. at 2253-61 (MCDD); see also JX 62 (documents vesting title for flowage easements acquired from HCDD3); JX 67 (documents vesting title for flowage easements acquired from MCDD); JX 68 at JA0431 (map showing real estate interests acquired by the Corps for the Navigation Project in the vicinity of HCDD3 and of MCDD).

Because the flowage easements acquired by the Corps from the drainage districts

in the 1930s were on the riverward sides of the levees, and because the 1961 releases did not expressly address takings claims, plaintiffs contend that the releases do not bar their takings claims for flowage easements obtained by the Corps inside the drainage districts pursuant to the 1961 releases, as asserted by the Corps in its 1994 letter to HCDD3. Pls.' Resp. Br. at 18-19 (citing Dureiko, 209 F.3d at 1356-57 (stating that "[i]f the release is ambiguous as to its scope of coverage, we construe its language to effect the parties' intent at the time they executed the release" and finding that the release did not bar claims, including takings claims, arising out of conduct beyond the scope of coverage of the release)).

Having heard testimony regarding the circumstances surrounding the execution of the releases and the subsequent communications between the Corps and plaintiffs regarding the maintenance of the HCDD3 levee system,[6] the court finds that plaintiffs have failed to show that, as a result of the behavior of defendant, they were made "'justifiably uncertain' with respect to their takings claim until the Corps asserted a flowage easement in 199[4]." Henderson II, 55 Fed. Cl. at 341. The exchange of correspondence and the conversations between the Corps and the commissioners of HCDD3 and MCDD prior to the execution of the 1961 releases left no justifiable uncertainty regarding the Corps' view of the scope of the releases, and the clarity with which the Corps' view was expressed by its counsel at that time and by other Corps officials subsequently could not have created a reasonable or justifiable basis for uncertainty.

Mr. Rodney Delp, who manages the Corps' flood control funding program under the Act of June 28, 1955, Pub. L. No. 84-99, 69 Stat. 186 (Public Law No. 84-99), Tr. at 2741, testified that the disrepair of HCDD3's levee was well-documented more than fourteen years before plaintiffs filed suit, Tr. at 2743:21-2753:22; see also JX 116 (Letter from the Corps to HCDD3 of 4/10/72, at 1, stating that, based "on the continued deplorable condition" of the HCDD3 levee system, the Corps is reviewing the possible removal of HCDD3 from the public works program under Public Law No. 84-99 authorizing federal assistance for levee restoration); JX 147 at JA0900 (Memorandum from the Corps to CDR US ACE [the Corps' Commander] of 1/4/82, at 1, removing HCDD3 from the Public Law No. 84-99 program following levee inspection "[b]ecause of . . . unsatisfactory maintenance"); id. at 03268, 03270 (noting levee erosion and

[6]Correspondence between the Corps and HCDD3 regarding the maintenance and repair of HCDD3's main stem levee during the1970s and the 1980s documents the Corps' communication with the drainage district regarding the adverse impact on HCDD3's eligibility for federal funding due to HCDD3's failure to maintain its levee system and to stem the evident erosion. See JX 115, JX 116, JX 123, JX 124, JX 147.

erosion of riverbank at base of levee among deficiencies present during the Corps' October 1980 inspection of HCDD3's levee); id. at 03277 (Letter from an independent consultant to the Corps of 10/5/81, at 1, stating that during his tour of the HCDD3 levee, he found "[t]he levee along the Mississippi River . . . in very poor condition with considerable evidence of erosion and slides on both faces of the levee").

In support of their claim of justifiable uncertainty, plaintiffs appeared to rely at trial on two documents in which the Corps noted "other authorities" or "existing authorities" under which drainage districts might obtain funding for levee maintenance. See Tr. at 1443-47 (testimony of Mr. Robb). The first, contained in House Document 135, is correspondence dated November 30, 1954 from the Corps addressing the concerns regarding the proposed settlement payment to the Iowa drainage districts for damages caused by the Navigation Project stating that "recurring conditions that may require future remedial measures can be carried on under existing authorities and would not require the authority contained in the River and Harbor Act of March 2, 1945."[7] JX 14 at JA0119. The second document is a letter dated March 8, 1993 from the Corps to Mr. Robb noting a "long history of association" between the Corps and HCDD3, the failure of HCDD3 to maintain its levees in accordance with the assurances executed in connection with the Public Law No. 84-99 program administered by the Corps and the existence of "[t]wo authorities . . . which may allow the Corps to evaluate potential [f]ederal participation for work on [HCDD3's] levee." JX 156 at JA0908, JA0910. Plaintiffs' reliance on these documents appears to be misplaced. While defendant acknowledges, without specific citation, that these other authorities do exist, defendant argues that "the existence of these other authorities did not create a 'justifiable uncertainty' about the existence of [plaintiffs'] takings claim" for statute of limitations purposes because the Corps has never even intimated that HCDD3 is not responsible for its own levee maintenance. See Def.'s Br. at 13. Moreover, plaintiffs conceded at trial that "most of the Corps' [assistance] programs require local participation, which is funding or some other service," Tr. at 1444:9-14 (testimony of Mr. Robb), and that they "did not" avail themselves of the existing authorities identified by the Corps and communicated to HCDD3, Tr. at 1445:1-17 (testimony of Mr. Robb).

Plaintiffs also appeared to rely at trial on two internal Corps memoranda which do not assist plaintiffs' claim of justifiable uncertainty. See Def.'s Br. at 13 ("During the trial, plaintiffs referenced two internal Corps memoranda (J[X]108, J[X]109) . . . .); JX 108 (Internal Corps Memorandum of 3/9/70 noting that "[n]eglected maintenance of th[e] [HCDD3] levee has been a matter of record for many years" and recommending that, "because proper maintenance of District No. 3 levees is necessary for the uninterrupted

[7]The Iowa drainage districts are not parties in this case.

operation of Navigation Pool No. 18, . . . Drainage District No. 3 be acquired by the U.S. Government"); JX 109 (Internal Corps Memorandum of 3/11/70 stating that "[i]f Henderson No. 3 is to be abandoned to the vagaries of the [Mississippi] [R]iver and the indolence of local interests, means of containing Pool No. 18 and protecting Henderson Nos. 1 and 2 must be considered" and proposing several alternatives). As defendant argues, see Def.' Br. at 14, it is undisputed that these memoranda were not acquired by HCDD3 until discovery in this case and, therefore, cannot have formed the basis of plaintiffs' claim of justifiable uncertainty.

With respect to the 1994 letter from the Corps to Mr. Robb asserting, for the first time, that the Corps had acquired, in the 1961 releases "any flowage easements necessary" in connection with the Navigation Project, PX 22, the court finds that plaintiffs were not made thereby, more than two decades after execution of the releases, justifiably uncertain as to the existence of their takings claim. The weight of the evidence does not demonstrate any inconsistency by the Corps over the past forty years in its denial of any responsibility for the repair of HCDD3's eroded levee although the reasoning underlying the Corps' refusal to act appears to have changed temporarily in the 1994 correspondence.[8] The court finds that the Corps' 1994 letter did not create any uncertainty regarding the Corps' position that it was released from all responsibility to the drainage districts in connection with the construction and operation of the Navigation Project. The evidence is uncontroverted that the Corps has consistently denied any legal obligation to the drainage districts for the Navigation Project even though the Corps' explanation for its lack of obligation has changed.

However, the court remains unconvinced that, in the absence of an explicit, bargained-for release of plaintiffs' takings claim, the 1961 releases operate to bar the claims. In the absence of any bargaining and any reference to takings in the text of the releases, the court concludes that the releases do not bar the takings claims of either the plaintiff drainage districts or the plaintiff landowners.[9] Dureiko, 209 F.3d at 1356-57

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[8]The Corps disclaimed its statement in the 1994 correspondence in 1997. DX 427 (Letter from the Corps to Henderson County of 10/2/97 stating that "no flowage easement rights were granted to, conferred upon or obtained by the United States by the 1961 release and the United States hereby disclaims this statement").

[9]As this court found in Henderson I, because the drainage districts "exist for the sole purpose of benefitting their constituent landowners," landowner plaintiffs "'would be reasonable in relying on the promise' to the drainage districts, if any, made in the [1961] releases." 53 Fed. Cl. at 52 (quoting Montana v. United States, 124 F.3d 1269, 1273 (Fed. Cir. 1997) (stating that "[o]ne way to ascertain [whether a third-party is intended to be benefitted by a contract] is to ask

(stating that "[i]f the release is ambiguous as to its scope of coverage, [the court] construes its language to effect the parties' intent at the time they executed the release," conducts a factual inquiry into the parties' intent and, "[i]n the absence of sufficient factual allegations supporting the parties' mutual intent, . . . construes the ambiguous contract provision against the drafter"). At the same time, the court also concludes that the behavior of defendant has not operated to extend the date of accrual of plaintiffs' takings claims to 1994 or any other date. The court turns now to address the facts relating to the accrual of plaintiffs' takings claim.

B. Accrual of Plaintiffs' Takings Claims

Title 28, United States Code, Section 2501 provides that "[e]very claim of which the United States Court of Federal Claims has jurisdiction shall be barred unless the petition thereon is filed within six years after such claim first accrues." 28 U.S.C. § 2501 (2000). In this case, plaintiffs have asserted a Fifth Amendment takings claim.

The Federal Circuit observed in Boling v. United States:

> In general, a takings claim accrues when "all events which fix the government's alleged liability have occurred and the plaintiff was or should have been aware of their existence." Thus, the key date for accrual purposes is the date on which the plaintiff's land has been clearly and permanently taken. However, in cases where the government leaves the taking of property to a gradual physical process, rather than utilizing the traditional condemnation procedure, determining the exact moment of claim accrual is difficult.

220 F.3d 1365, 1370 (Fed. Cir. 2000) (citations omitted) (emphasis added). In Banks v. United States, the Federal Circuit explained that "[t]he accrual of a takings claim where the government leaves the taking of property to a gradual physical process occurs when the situation has 'stabilized.'" 314 F.3d at 1308. The Supreme Court first stated in United States v. Dickinson that stabilization occurs when "the consequences of inundation have so manifested themselves that a final account may be struck." 331 U.S. 745, 749 (1947).

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whether the beneficiary would be reasonable in relying on the promise as manifesting an intention to confer a right on him")). The court concluded that the landowner plaintiffs "are third party beneficiaries of any contractual undertakings by defendant in the [1961] releases." Id. The court concludes that the landowner plaintiffs remain entitled to the same treatment under the releases as the plaintiff drainage districts.

In making the determination of whether a takings claim based on the gradual process of erosion has accrued, the Federal Circuit stated:

> [D]uring the time when it is uncertain whether the gradual process will result in a permanent taking, the plaintiff need not sue, but once it is clear that the process has resulted in a permanent taking and the extent of the damage is reasonably foreseeable, the claim accrues and the statute of limitations begins to run.

Boling, 220 F.3d at 1371 (emphasis added). "The point at which the taking becomes sufficiently certain to give rise to a claim for compensation varies in each case," Cooper v. United States, 827 F.2d 762, 764 (Fed. Cir. 1987), and is a fact-intensive inquiry. Among the factors to be considered by the fact-finder are "the uncertainties of the terrain, the difficulty in determining the location of the government's easement, and the irregular progress of erosion." Boling, 220 F.3d at 1373.

In Applegate v. United States, the Federal Circuit found that the takings claims filed by certain shoreline property owners against the Corps were not time-barred because their claims had not stabilized more than six years before the filing of their complaint. 25 F.3d 1579, 1582 (Fed. Cir. 1994). The Federal Circuit stated that "[t]he gradual character of the natural erosion process set in motion by the Corps, compounded by the Government's promises [over a period of twenty years] of a sand transfer plant [to mitigate plaintiffs' loss of sand], have indeed made accrual of the landowners' claim uncertain." Id. The Federal Circuit concluded that the landowners' "uncertainty ha[d] stayed accrual of the claim" because the "Government's promises to restore the littoral flow destroyed any predictability of the extent of damage to the land." Id. at 1583.

Plaintiffs' theory concerning the accrual of their takings claim has changed in the post-trial briefing from the theories advanced in plaintiffs' earlier summary judgment briefing and in plaintiffs' pre-trial memorandum.

In the parties' first cross-motions for summary judgment, plaintiffs argued that their action was timely because the Corps had changed its dredging operations in connection with the Navigation Project. See Memorandum In Support of Plaintiffs' Motion for Partial Summary Judgment at 26-29 (arguing that plaintiffs' takings claims did not accrue until formal discovery revealed defendant's reduction of dredging operations).[10]

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[10]This theory was decisively rebutted at trial by the testimony of defendant's expert in hydraulic and hydrologic engineering, Mr. Michael Ports. Tr. at 2508:25-2509:2 (stating that

In the parties' second cross-motions for summary judgment and in plaintiffs' pre-trial memorandum, plaintiffs contended that they could not have known that they had a takings claim against the Corps for the operation of the Navigation Project before 1994, when plaintiffs first learned, by correspondence from the Corps, of the Corps' assertion of a flowage easement in HCDD3 allegedly obtained in the execution of HCDD3's 1961 release. See Henderson II, 55 Fed. Cl. at 340-41 (analyzing plaintiffs' argument); Plaintiffs' Memorandum of Contentions of Fact and Law (Pls.' Memo.) at 5-6 (asserting that defendant stated that it had obtained a flowage easement "for the first time on the record" in a 1994 letter).[11]

Based in part on plaintiffs' contention that they could not have known that they had a takings claim against the Corps for the operation of the Navigation Project before 1994, when plaintiffs first learned, by correspondence from the Corps, of the Corps' assertion of a flowage easement in HCDD3 allegedly obtained in the execution of HCDD3's 1961 release, the court denied defendant's cross-motion for partial summary judgment and declined to find plaintiffs' taking claim time-barred. Henderson II, 55 Fed. Cl. at 341, 343. The court has found, on the facts presented at trial, that neither the 1994 letter or any other communication of the Corps could have caused uncertainty about the accrual.

Finally, in post-trial briefing, plaintiffs contend that they could not have known of their potential takings claim until after they filed this lawsuit and received a copy of Appendix I, a document detailing the technical assumptions underlying the Corps' recommendations set forth in House Document 135 for payments to the drainage districts for damages caused by the Navigation Project. See Pls.' Br. at 42-49.

Relying on plaintiffs' framing of the issue in its post-trial briefing and the evidence at trial, the court now addresses the accrual of plaintiffs' takings claims, examining, in turn, each of the "gradual physical process[es]" by which plaintiffs allege their property

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"since the nine-foot navigation project has been in placed in full operation in 1941, . . . the operation of that system has been in conformance with the Congressionally-authorized limits").

[11]This theory was largely abandoned in the face of evidence that easements had in fact been obtained from individual landowners. See Tr. at 163:3-7 (testimony of Mr. Crane); JX 62 (documents vesting title for flowage easements acquired from HCDD3); JX 67 (documents vesting title for flowage easements acquired from MCDD); JX 68 at JA0431 (map showing real estate interests acquired by the Corps for the Navigation Project in the vicinity of HCDD3 and of MCDD).

was taken,[12] particularly: (1) the excess seepage, alternatively referred to as excess pumping costs; (2) the inability to gravity drain effectively; and (3) the erosion of the drainage district levees. See Banks, 314 F.3d at 1308 ("[A] takings claim where the government leaves the taking of property to a gradual physical process occurs when the situation has 'stabilized.'").

1. Excess Seepage

To address the damages caused to levee and drainage districts by the operation of the Navigation Project, Congress directed the Corps in the early 1930s to undertake a series of damage surveys and report the findings to Congress. Pls.' Memo at 3. The reports were incorporated into Congressional House Documents. Id.; see JX 3 (H.R. Doc. 73-34 (1934)); JX 4 (H.R. Doc. 75-34 (1937)). Congress received the last of these reports, House Document 135, in 1955 and adopted the report in the River and Harbor Act of 1958, Act of July 3, 1958, Pub. L. No. 85-500, tit. I, 72 Stat. 297, 297-305. Pls.' Memo at 3.

House Document 135 states that "[t]he establishment of the navigation pools has resulted in damage by seepage and backwater to a number of drainage and levee districts bordering the river." JX 14 at JA0120. House Document 135 further states that:

> damages suffered by the drainage districts consist principally of additional pumping costs necessitated by higher river stages caused by the navigation pools. The additional pumping includes pumping during periods when gravity drainage would have been available if the pools had not blocked gravity drains, pumping against an increased head caused by the higher pool stages, and pumping an increased amount of seepage caused by sustained river levels due to pool operation. Most of the pumping plants have inadequate pumping capacity to remove the increased seepage caused by the navigation pools during the summer months when excessive rainfall occurs.

Id. at JA0122.

Based on an estimate by the Corps' district engineer of the "average amounts of future drainage to be pumped from increased seepage, blocked gravity flow, and against an additional head," House Document 135 recommended lump sum payments to the

[12]Plaintiffs have not expressly identified the particular "property interest" alleged to have been taken. It appears to the court, however, from plaintiffs' various arguments and the evidence presented at trial, that the property interest is the value of the agricultural land.

seventeen drainage districts impacted by the Navigation Project, including HCDD3 and MCDD, for damages, remedial work and land acquisition or flowage easements. Id. The Corps recommended payments to HCDD3 and MCDD, respectively, in the amounts of $43,929 and $836. Id. at JA0123.

As set forth in House Document 135, the recommended payment to HCDD3 is based on: (1) an estimated "average annual increased pumpage" volume of 2,824 acre-feet, "consist[ing] entirely of increased seepage due to pool No. 18 [of the Navigation Project];" (2) an estimate of the annual cost to pump the additional drainage; (3) an estimate of annual depreciation; and (4) the estimated cost of additional pumping facilities. Id. at JA0161. Within the paragraph in House Document 135 detailing the basis for the Corps' recommended amount of payment to HCDD3, the Corps reports that the "[a]verage annual normal pumpage has been estimated to be 867 acre-feet," and cites page seventeen of Appendix I, a document that is "[n]ot printed" according to the footnote following the citation. Id.

The recommended payment to MCDD is based on an estimate of the annual increased cost of normal pumpage. Id. at JA0166. House Document 135 states that "[c]omputations indicate that there is no increased seepage" for MCDD. Id. House Document 135 further states that gravity drainage is possible during operation of Pool No. 22 of the Navigation Project approximately seventy percent of the year. Id. Within the paragraph in House Document 135 detailing the basis for the Corps' recommended amount of payment to MCDD, the Corps reports that the "[a]verage annual normal pumpage [volume] at increased lift is estimated to be 2,345 acre-feet," and cites page twenty-four of Appendix I, a document that is "[n]ot printed" according to the footnote following the citation. Id.

Plaintiffs argue that the Corps' failure in 1955 to print Appendix I, which reflected the specific calculations on which the Corps relied in preparing its recommendations in House Document 135, prevented the drainage district commissioners from reviewing erroneous data that the Corps used to determine the sums of money to be paid by Congress. Pls.' Br. at 15-16. Plaintiffs state that page seventeen of Appendix I, see PX 112, estimates gross seepage of more than 9000 acre-feet into HCDD3 from the Navigation Project, see Pls.' Br. at 43, assumes "HCDD3's ability to gravity drain 6200 acre-feet of seepage," Pls.' Resp. Br. at 8, and "require[s] [HCDD3] to pump 2824 acre[-]feet of water" of excess seepage from the drainage district, id. But, plaintiffs contend, the actual pumping plant records "from the 10-year study period allegedly relied upon [by the Corps] to create the numbers in Appendix I (P[X]112) . . . [and] used [by the Corps] to calculate the release payments [to the drainage districts] show . . . that the actual recorded pumping requirements for HCDD3 are 250% more pumping due to the

Navigation Project than the 2824 acre-feet reported to Congress." Pls.' Br. at 43-44. Plaintiffs also point out that while MCDD is listed "as only pumping 2345 acre-feet [o]n [page twenty-four] of Appendix I (P[X]112), . . . the Corps' records in J[X]11[U.S. Army Corps of Engineers, Review of Report Submitted in Rivers and Harbors Committee Document Numbered 34, 75th Congress, 1st Session (1953)] show that Marion was actually pumping on average over 5500 acre-feet in the mid-1940s." Id. at 48. Plaintiffs assert that, because they were not given a copy of Appendix I "or referred to a House Document, other than [House Document] 135 where [Appendix I] was printed in 1961," id. at 44, they had no "chance of learning that they were wronged in 1961 and the extent of th[at] wrong" until they discovered Appendix I during the course of this litigation, id. at 49.

To begin with, plaintiffs' claim of ignorance is rendered ambiguous at best by the testimony of its own fact witnesses. Plaintiffs themselves provided evidence that the farmers within HCDD3 were aware of soil wetness issue many years ago including, for example, the testimony of the landowners concerning the appearance of "boils," that is, places where water bubbled up to the land's surface within the drainage district. See Def.'s Br. at 10. Mr. George Torrance, a drainage district commissioner in Henderson County Drainage District No. 1, who leased farmland in HCDD3 in the late 1960s, see Tr. at 962:14-25, 963:19-23, and intermittently between 1988 and 1997, see Tr. at 933:4-7, testified that he had seen, "along [the HCDD3] drainage ditches . . . [boils or] little springs that the water comes out of and the higher the water is in the river the bigger the[] springs are," Tr. at 948:9-12. "[F]or about 39 years, since 1967," Tr. at 983:2-6, Mr. Torrance testified, he had seen boils containing "red [iron] water" that he attributed to Mississippi River water coming into the drainage district "at the base of the drainage ditch bank," Tr. at 952:15-21. In 1989, Mr. Torrance discussed with the HCDD3 commissioners the high water levels in the drainage ditches that were "running . . . back[] into the corn fields" and urged the commissioners "to keep the pumps going more." Tr. at 939:1-23. Mr. Torrance testified that, in 1988 or 1989, he recalls seeing water at the bottom of holes from which he had removed fence posts and at the bottom of holes from which he had removed trees while bulldozing the land. Tr. at 949-50.

Additionally, Mr. Robb, a landowner in HCDD3 since 1988, Tr. at 1427:10-13, testified that after purchasing his property and digging holes on it to obtain soil samples, he encountered water close to the surface of the land and began to suspect, in 1989, that there was a water problem on the property. Tr. 1428-30. Mr. Robb testified that he performed an extensive analysis of the increased costs incurred by the plaintiff drainage districts due to the increased seepage caused by the Navigation Project. Tr. at 1284-1306. After examining historical documents and records, specifically "[a]ll of the . . . annual expenditures [for HCDD3's pumping costs]," Tr. at 1458:20-24, "receipts for . . . energy

purchased, [and] indices from Department of Energy," Tr. at 1458:10-13, Mr. Robb prepared "a rough estimate" of the excess pumping costs incurred by HCDD3 due to the operation of the Navigation Project, Tr. at 1462:16-20. See PX 69 (spreadsheet of HCDD3's excess pumping costs). Following discussions with Mr. Robb, Mr. Brent Hoerr, a commissioner for MCDD, prepared a similar spreadsheet for MCDD. See Tr. at 1904-05; PX 70 (spreadsheet of MCDD's excess pumping costs). Plaintiffs' own testimony and evidence indicates that they were on notice of excess water in their fields from some source many years ago.

Defendant denies that it is now responsible to the drainage districts for "'excess' seepage--that is, more seepage than was anticipated in House Document 135 . . . [because] the evidence . . . demonstrates that this claim is brought several decades too late." Def.'s Br. at 9. Defendant points specifically to the testimony of Mr. Michael Ports, an expert in hydraulic and hydrologic engineering, regarding the stabilization of the Navigation Project after its construction. See id. at 10 (referencing Mr. Ports' testimony in connection with HCDD3).

Mr. Ports testified that he reviewed the Corps' daily log of the water levels maintained at Pool 18 and Pool 22 of the Navigation Project dating from 1939 through the present.[13] Tr. at 2504-05. Based on his review of the Corps' records, Mr. Ports opined "[t]hat since the nine-foot [N]avigation [P]roject has been placed in full operation in 1941, . . . the operation of that system has been in conformance with the [c]ongressionally-authorized limits" for both HCDD3 and MCDD. Tr. at 2508:24-2509:2. Mr. Ports' testimony that the Corps has consistently operated the Navigation Project within the congressionally-established limits was unrefuted at trial.

With respect to when the effects of the Navigation Project on the drainage districts stabilized, Mr. Ports testified:

> Based on our observations of many major alluvial systems around the world, based on our review of the detailed design documents of the original navigation structures, and based on the actual data of river levels that the Corps has maintained, that certainly within a matter of a couple of years, no

[13]He explained that, for the period of time from 1939 to 1975, he was able to review the Corps' logs recording the water levels in the pools but not the Corps' handwritten logs of when each gate was removed because the Corps had not been able to locate those records. Tr. at 2506:1-6. He added that for the period of time from 1976 forward, the Corps did have handwritten logs recording when the dams were removed as well as the water levels. Tr. at 2506:7-9.

more than three or so, that the river would have adjusted hydrologically to the imposition of all those navigation structures throughout its length.

Tr. at 2516:16-24.[14] Mr. Port's testimony that the impact of the Navigation Project on the drainage districts would have stabilized within three years of the construction of the Navigation Project was also unrefuted.

In addition to introducing Mr. Ports' testimony about the stabilization of the Navigation Project and its effects on the drainage districts, defendant offered the expert testimony of Dr. Barrett Kays, a licensed soil scientist, see Tr. at 2579-81 (introducing Mr. Kays and his credentials), to address both the source of and the period of time during which the drainage districts have experienced their "excess soil wetness" problems. Dr. Kays testified that he investigated plaintiffs' claims of seepage to determine whether there was any connection between the operation of the Navigation Project and the "excess [soil] wetness" conditions in the drainage district lands. Tr. at 2595:8-15. As part of his investigation, Dr. Kays obtained existing soil surveys performed by the United States Department of Agriculture's Natural Resource Conservation Service (NRCS) and topographic maps from the United States Geological Survey of HCDD3, MCDD and the areas surrounding the drainage districts. Tr. at 2595:16-22; 2597:16-18. He gathered daily rainfall data from 1950 through the end of 2002, Tr. at 2606:2-3, and "the minimum

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[14]Mr. Ports explained the hydrological adjustment of the river using the following analogy:

> If you were to walk out to the edge of the river and stick your finger in, or stick into the river, you would see the river react to that by flowing, there would be a little wake around the obstruction. And it would come to a new dynamic equilibrium based on the imposition of that, and it would do it fairly quickly, because you didn't change the system very much.
>
> But there are . . . more than a couple of dozen dams, from St. Paul, Minnesota all the way down to St. Louis, the construction of all those is a whole lot of fingers, a whole lot of sticks in the rivers, at a whole lot of places.
>
> It created immediately a perturbation in the hydrologic characteristics of that river. It interrupted it.
>
> [And] . . . [i]t would take some time in order for the river to reach another dynamic equilibrium, because you've affected its low flows every year from then on.
>
> And my experience has been . . . [that] it takes a couple of years, maybe as many as three . . . [to] come again to a new dynamic equilibrium.

Tr. at 2517:6-2518:5.

and maximum temperature data for each of those days in that [fifty-two]-year period[]," Tr. at 2606:3-5, and spoke with NRCS's district conservationist for HCDD3 and with two persons in NRCS's soil survey division to learn more about the conditions in the district. Tr. at 2596:18-25. He also conducted a site visit to HCDD3 during which he talked with several farmers to determine when and under what moisture conditions in the spring the farmers are able to plant their corn and soybeans. Tr. at 2596:11-17.

During his site visit to HCDD3, he selected five different places in the fields of the drainage district into which he augured down approximately six feet into the soil and installed borings that permitted him to examine the soil characteristics and the water levels in the drainage district. Tr. at 2598-99, 2605. The five representative boring sites permitted Dr. Kays to examine, in particular, the various layers, known as horizons, of the major types of soil in the drainage district at different elevations and on the property of each of the landowner plaintiffs in this case. Tr. at 2598-99, 2605. Dr. Kays explained that "a few inches' difference in elevation across the fields is very significant, in terms of drainage." Tr. at 2603:6-7. He also conducted hydraulic conductivity tests for the various layers in the soil, and from tests of the various soil samples taken from the different layers of soil, he determined the amount of sand, silt and clay present in the soils, the density of the soil layers and the total porosity of the different soil layers. Tr. at 2608:7-23.

With the detailed information gathered about the drainage district, Dr. Kays performed an evaluation of the land in HCDD3 using a computer simulation program called Drain Mod, a program developed at North Carolina State University. Tr. at 2585:11-17. The program assists agricultural operators in eastern North Carolina, a geographical area that has very high water table conditions, in managing, irrigating and draining their cropland. Id. at 2585-86, 2609. Using data on the HCDD3 soil, weather, crops, and drainage, Dr. Kays set the values in the computer program to assess the crop yields produced in the drainage district.[15] Tr. at 2609:6-19; 2611-12. Dr. Kays testified that he "used the [computer] model to isolate different variables . . . to figure out exactly what's causing the excess wetness in the fields." Tr. at 2630:1-3.

Dr. Kays testified that sawmill soil is the "most prevalent [soil type] within the district" and that sawmill soil "is a very tight soil, and very difficult to drain." Tr. at 2632:20-25. Based on the prevalence of sawmill soil in HCDD3, he opined that the ditch spacing and the spacing between the tile lines in the drainage district were too far apart to

[15]In setting up his computer simulation, Dr. Kays assumed that the best varieties of corn and soybeans are being planted and that good farming management practices, such as proper fertilization, are in place. Tr. at 2612:5-9.

achieve adequate drainage. Tr. at 2630-31.

With respect to the impact of subsoil on soil drainage, Dr. Kays testified that, based on both his experience and his study of the soil in HCDD3, the soils in the drainage district are difficult to drain of moisture due to the high clay content in the subsoil. Tr. at 2633:11-16. He explained that the type of clay present in the drainage district's subsoil is montmorillonite, "the most difficult type of clay mineral to have in a soil because it shrinks and swells." Tr. at 2633:20-23. He added:

> [W]hen you have a lot of water in [that type of clay], the soil swells up, and it stays wet. It is the type of clay that holds the water extremely tightly, and it's extremely difficult to drain.
>
> And so [in] the areas [where] you find . . . the highest percent in the subsoil, . . . [t]hat is the most difficult one to drain.

Tr. at 2633:23-2634:5.

Dr. Kays stated that the flatness of the fields in the drainage district allows "a lot of surface [r]etention of water during a rainstorm and after." Tr. at 2642:6-22. He suggested that, to improve drainage in the fields, HCDD3 might "crown" the fields between the drainage ditches and create gradual slopes away from the elevated "crown" portions of the fields. Tr. at 2641-43.

He concluded that "[t]he elevation of water at the pump station does not affect productivity in the fields under the existing conditions out there." Tr. at 2646:3-5. He explained that "under the existing ditch spacing and the existing field flatness and other factors, [the elevation of water at the pump station] has no effect." Tr. at 2646:6-7. Dr. Kays also explained that the effect on the farmers' crops was not due to high water levels at the intake bay but rather due to the "climatic differences" between dry years and wet years. Tr. at 2646-47.

Dr. Kays stated that, although he believes that the farmers' observations regarding their crop yields and the coloration of the water in HCDD3 are "accurate," Tr. at 2646-47, 2654, he believes that the farmers have drawn the wrong inferences about the source of the water in the drainage district, Tr. at 2654:5-9. Dr. Kays explained that the reduced crop yields are due to: (1) the lack of field sculpting (crowns and slopes) to increase drainage, Tr. at 2649:5-8; (2) the absence of flashboard risers (small weir-like devices) in the drainage ditches in the fields to maintain the water table at two feet, the ideal depth for crop growth, Tr. at 2649:9-22; see also Tr. at 944:25-945:3 (testimony of Mr.

Torrance stating that he would want the water level in the ditches to be two feet to grow corn and soybeans); (3) the lack of drainage lines installed at the proper depth and spacing for the various soil types to facilitate soil drainage, Tr. at 2650:6-9; and (4) the failure to shape and flatten the drainage ditches to reduce the amount of head created by the difference between the river elevation and the intake bay, which would thereby reduce the amount of seepage into the drainage district, Tr. at 2650-51.

Dr. Kays also explained that the coloration of the water observed in the drainage district ditches is caused by the natural chemical process of gleyization, and not by the water coming in from the Mississippi River. Tr. at 2655:3-14. Gleyization occurs when the reddish, brownish or yellowish-brownish colored iron oxides that coat the clays in soil begin to reduce and become soluble in soil that has had a high water table for a period of twenty-one days or more. Tr. at 2654-55. Dr. Kays testified that, based on the wet conditions in HCDD3:

> [W]e'd expect in the ditches in the district, at various times in the year, for iron oxides to wash out of the soils and come out into the ditch water. It is going to be something that is going to be from the soils in the district, and not from just the river water coming in.
>
> I mean, you could have some coming in, but it's clearly, what I saw out there, and from the kinds of water table conditions you have, it just naturally occurs throughout the district.

Tr. at 2655:9-18.

Dr. Kays opined that, "based on [his review of] the soils [in HCDD3,] . . . the old mapping of the soils, . . . the topography, . . . the ditches [and] . . . other kinds of things on the [historical] aerial photo[graph]s, . . . things were [not] fundamentally different back in 1929 [than] they are today." Tr. at 2656:20-24. He noted, however, that some irrigation and some additional drain lines are now in the fields that did not previously exist. Tr. at 2656:25-2657:2.

With respect to MCDD, Dr. Kays testified that he did not perform a Drain Mod analysis because there are no individual plaintiffs in this case owning property in the district onto which Dr. Kays could gain access. Tr. at 2675:1-11. Accordingly, Dr. Kays performed an evaluation of the drainage and soils in MCDD based on a tour of the drainage district with Mr. Brent Hoerr, the chairman of MCDD's commission, and a review of topographic maps of the area, county survey data, and other information obtained from the NRCS. Tr. at 2668:14-2669:3.

Dr. Kays testified that, like the soils in HCDD3, the mapped soils for MCDD contain "a very, very high amount of montmorillonitic clays." Tr. at 2676:2-5. He stated that the most prevalent soil in the drainage district is Carlo soil, which "has a very high amount, over [fifty] percent, of montmorillonitic clay in the subsoils . . . and [s]o . . . is a very, very difficult soil to work with . . . [and has] perhaps a higher amount of the problem characteristics . . . than we found in the Henderson drainage district." Tr. at 2676:6-12. Dr. Kays added that, according to the NRCS and the Missouri Cooperative Extension Service, Carlo soil is rated lowest for crop yield, even assuming best management practices, and that Carlo soil is the most extensive soil type in MCDD. Tr. at 2680-81.

Dr. Kays further testified that MCDD has "an upland drainage area that drained" into a detention basin constructed in the central portion of the drainage district. Tr. at 2682:15-24. The detention basin is designed "to hold back the water during heavy run-off events from the uplands." Tr. at 2683:14-15. Using a program that the NRCS "has for estimating run-off, [and] watersheds," Tr. at 2684:22-23, Dr. Kays calculated the average amount of yearly run-off coming into the drainage district based on an analysis of the daily rainfall events from 1950 to 2002, Tr. at 2685:7-9. Evaluating all of the information that he had gathered on MCDD, Dr. Kays opined:

> [T]he utility usage [increased pumping requirement in MCDD] is very closely probably related to the rainfall over the district, and the rainfall over the uplands to the west that drain into the district. So that appears to be what's influencing it. And there's not any other significant factor that seems to be affecting it.

Tr. at 2688:1-8. Dr. Kays further opined that, based on the information he reviewed, the testimony of plaintiffs' experts and the study he performed, there is no basis for plaintiffs' contention that the Navigation Project is the cause of their increased pumping costs in recent years. Tr. at 2688:9-16.

Plaintiffs' offered no evidence to refute Dr. Kays' conclusions that the excess soil wetness conditions had existed in the drainage districts for some time. See Tr. at 2656:20-24 (stating that soil conditions in HCDD3 were not "fundamentally different back in 1929 [than] they are today"); Tr. at 2688:9-16 (concluding that the Navigation Project was not the cause of MCDD's increased pumping costs in recent years). Rather, as Dr. Kays observed during his testimony, plaintiffs' testimony about their diminished crop yields and discolored water within the drainage district was consistent with his field observations and computer analysis. See Tr. at 2646-47 (stating that plaintiffs "accurately assess[ed]" their crop yields each year and explaining that differences were due to

"climatic differences"); Tr. at 2653:24-2655:22 (noting that plaintiffs' observations regarding discolored water are "correct" and explaining why the water is discolored).

Defendant argues that the observations before 1990 by the HCDD3 commissioners and farmers of water close to the land surface in HCDD3 together with the expert opinion of its hydraulic engineer concerning the stabilization of river conditions several years after the construction of the Navigation Project are sufficient evidence that plaintiffs' takings claims for excess seepage claims were knowable more than six years prior to the filing of this action in 1997.[16] See Def.'s Br. at 5-15; Def.'s Reply at 1-2. Moreover, defendant argues, although House Document 135 stated that Appendix I was "[n]ot printed," JX 14 at JA0161, JA0165, no one from HCDD3 or MCDD ever asked Mr. Crane for a copy of the document. Tr. at 481:16-24 (Mr. Crane's testimony). Mr. Crane testified that, if someone had asked for a copy of the appendices that were not printed, he would have:

> either given [the appendices] to them or invited them to come examine [them] at our office, depending on the cost of reproduction and so forth . . ., what was involved. But I certainly would have given them access to the information.
>
> These were public documents which they could have obtained from their congressman, from the Government Printing Office, from us.

Tr. at 482:3-10.

Mr. Crane's testimony about the availability of Appendix I upon plaintiffs' request was uncontradicted at trial. Plaintiffs presented no evidence that, prior to their execution of the releases, they could not have obtained the document if they had requested it from the Corps directly or from some other public source. As established at trial, plaintiffs did not know about the Corps' excess seepage calculations. But the document containing the calculations, although "[n]ot printed," could have been obtained. Even without detailed knowledge of the calculations underlying the Corps' excess seepage estimates, plaintiffs did know, from the text of the 1961 releases, of the existence of House Document 135 and that House Document 135 governed the payment of damages to the drainage districts. See supra note 3 (quoting release).

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[16]Although defendant points to the year in which this action was transferred to this court, the proper date to be considered for statute of limitations purposes is October 1, 1996, the date on which plaintiffs first filed this action in the United States District Court for the Central District of Illinois. See Order of Jan. 8, 2004, at 5.

House Document 135 itself acknowledged damage to "a number of drainage and levee districts bordering the [Mississippi River]" caused by seepage and backwater from the Navigation Project. JX 14 at JA0120. For HCDD3, House Document 135 set forth a projected "average annual increased pumpage" volume of 2824 acre-feet, "consist[ing] entirely of increased seepage due to pool No. 18 [of the Navigation Project]." Id. at JA0161. For MCDD, House Document 135 stated that "there is no increased seepage" from the Navigation Project, but estimated an "[a]verage annual normal pumpage [volume] at increased lift . . . [of] 2,345 acre-feet." Id. at JA0166.

At the time that plaintiffs executed the 1961 releases, the Corps' estimates of increased seepage and pumpage due to the Navigation Project were knowable and available to plaintiffs. Plaintiffs' trial testimony also indicates that plaintiffs experienced increased pumping costs and observed physical evidence that should have put them on notice of a possible claim for excess seepage more than six years prior to the filing of this action. Plaintiff landowner Mr. Robb specifically acknowledged an awareness of a water problem on his property in 1989. About that same time, in 1988 or 1989, Mr. Torrance, who was farming the property owned by landowner plaintiff in this action, the Estate of Glen Romkey, Tr. at 938:15-18, expressly addressed the problem of the high water level in the HCDD3 drainage ditches with the HCDD3 commissioners. Moreover, plaintiffs failed to refute Mr. Ports' testimony regarding the stabilization of the effects of the Navigation Project on the drainage districts or Dr. Kays' testimony regarding the moisture-retentive characteristics of the drainage districts' soils, which have not been shown to have changed over the relevant time period. Based on evidence that the physical processes occurring as a result of the Navigation Project stabilized shortly after its construction, and in light of evidence regarding the science of the drainage districts' soils, and because plaintiffs' claims for excess seepage were both knowable and known more than six years prior to the filing of this suit, see Boling, 220 F.3d at 1370 ("In general, a takings claim accrues when all events which fix the government's liability have occurred and the plaintiff was or should have been aware of their existence." (quotation omitted)), the court finds that plaintiffs' excess seepage claims are time-barred.

2. Gravity Drainage

Running along the northwest border of HCDD3 in a southwesterly direction between Mississippi River mile posts 416 and 410 is Pool 18 of the Navigation Project. See PX 45 (1955 Corps map of HCDD3). The pool level in Pool 18 is controlled by Lock and Dam 18, which is located at Mississippi River mile post 410.5. Id. Located southwest of Pool 18 is Pool 19. Id. The tailwater gauge for Pool 18 is located in Pool

19.[17] Pls.' Br. at 17. HCDD3 discharges excess water in the drainage district--which plaintiffs claim is water seeping into the drainage district from Pool 18 along the Mississippi River--into the Henderson River, which runs from east to west at the southern border of HCDD3 and discharges into Pool 19 of the Mississippi River at river mile post 410. PX 45; see also Pls.' Br. at 17. Just northwest of the mouth of the Henderson River, located at Mississippi River mile post 411.6, is HCDD3's gravity drain culvert, "a concrete culvert 4 feet [square] by 4 feet high," Pls.' Br. at 17 & n.89, and about ninety-four feet long, Tr. at 573:6-19 (testimony of Mr. Munson). Mr. Robert Munson, a commissioner and landowner within HCDD3 since 1996, Tr. at 554:18-24, testified at trial that the elevation for the gravity drainage inlet is 518.3 MSL (mean sea level), Tr. at 573:13-574:8, and the elevation for the gravity drainage outlet is 517 MSL, Tr. at 574:10-14.

Plaintiffs argue that because the impact of the tailwater from Lock and Dam 18 on the ability of HCDD3 and MCDD to gravity drain "was not discussed in any of the three . . . Reports [of the Corps] to Congress, it was unknown and unknowable to the districts and their farmers." Pls.' Br. at 16. Plaintiffs contend that they did not learn that the Corps' assumptions concerning the ability of the drainage districts to gravity drain were erroneous until they obtained a copy of Appendix I. Id. at 15-16.

Pointing to Corps documents that show that eighty percent of the time the tailwater gauge for Pool 18 is two feet above the inlet elevation of HCDD3's gravity drain culvert and three feet above the outlet elevation of HCDD3's gravity drain culvert, plaintiffs contend that HCDD3 could not gravity drain as assumed in the settlement payment calculation for HCDD3. See Pls.' Br. at 16-17 (citing JX 43 at JA0408 (River Elevation - Duration Profiles, in U.S. Army Corps of Eng'rs, Master Water Control Manual, Lock & Dam 19 (1996))). At trial, Mr. William Gretten, a civil engineer with the Corps, Tr. at 1080:10; 1081:1-7, confirmed that the Pool 18 tailwater gauge exceeded the elevation of 521.5 MSL fifty percent of the time for any year, Tr. at 1111:14-1112:3. HCDD3 landowner Mr. Robb testified that, after reviewing the Corps' website and comparing tailwater gauge readings from 1939 to 1948, the ten-year period of study on which the Corps relied in House Document 135, with tailwater gauge readings from 1961 to 2003, the time period after the execution of the 1961 release, he determined that the average tailwater gauge readings at Lock and Dam 18 had increased nearly one foot from 520.72 MSL to 521.7 MSL. Tr. at 1271:4-10; 1272:25-1273:16.

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[17]Tailwater "is simply, in layman's terms, the water surface elevation on the downstream side of [a] hydraulic structure or facility," such as a dam, a pipe or a culvert. Tr. at 2513:1-5 (testimony of Mr. Ports, defendant's hydraulic engineering expert, see Tr. at 2502:13-20).

Moreover, plaintiffs' civil engineering expert, Mr. Michael Klingner, Tr. at 1520:7, 23, testified that, when the elevation of the tailwater increases at Lock and Dam 18, the point at which the water from Pool 18 flows into Pool 19 along the Mississippi River, the water backs up into the Henderson River from the Mississippi River, raising the mean sea level of the Henderson River and making gravity drainage out of HCDD3 impossible, Tr. at 1547-48. Mr. Klingner testified that, "[f]or farming purposes," HCDD3 likes to keep the water level at the pumphouse intake bay "between 519 [MSL] and 520 [MSL]." Tr. at 1570:1-19. Plaintiffs' structural engineering expert, Mr. Gregory Petersen, Tr. at 408:16; 416:5-6, testified that, based on his review of the water marking effects at the HCDD3 pumphouse intake bay, Tr. at 427:10-12; 440:25-441:10, HCDD3 had maintained the water level at the pumphouse intake bay between 519.1 MSL and 519.5 MSL "more times than not," Tr. at 440:20-22; 443:2-7, which is more than a foot lower than the intake bay water level range of 520.7 MSL to 522.4 MSL that the Corps relied upon in Appendix I and House Document 135. Tr. at 446-47; PX 112 at 17 (Appendix I); JX 14 at JA0160-61 (H.R. Doc. No. 84-35 (1955)).

Defendant argues that the ineffectiveness of the drainage districts' gravity drain operations was apparent to plaintiffs many more than six years prior to the filing of this action. Def.'s Br. at 5. Defendant points out that the gravity drain in HCDD3 was closed in 1970 or 1971. Tr. at 580:18-581:7 (testimony of Mr. Munson); Tr. at 666:1 (same). Mr. Munson testified that he had not seen the gravity drain operating since 1967, Tr. at 685:3-8, and that, at the request of HCDD3's commissioners, he closed the gravity drain because "[t]he concrete had cracked and the gate wouldn't seal tight anymore, and water was running back in all the time into the drainage district." Tr. at 581:5-7; see also Tr. at 666:7-8 (Mr. Munson describing the conditions of the gravity drain before he closed it). Additionally, Mr. Howard Pruett, who is a named plaintiff in this action and was a HCDD3 commissioner in 1971, Tr. at 870:12-13, testified that the gravity drain "would work occasionally" before it was sealed in 1971 and that the concrete foundation of the gravity drain was cracked at that time. Tr. at 919:6-22. Because HCDD3 did not file suit "within six years of permanently sealing its own gravity drain," defendant argues that HCDD3's takings claim for the inability to gravity drainage is time-barred. Def.'s Br. at 5-6.

The court agrees that plaintiffs' own testimony that HCDD3 permanently sealed its gravity drain in 1971 to prevent water from running back into the drainage district through the gravity drain is clear evidence that plaintiffs were aware of HCDD3's inability to gravity drain some twenty-five years before filing suit.

Plaintiffs also argue that MCDD cannot gravity drain to the extent described by the Corps in House Document 135 due to higher tailwater levels and increased siltation. Pls.'

Br. at 19. Plaintiffs contend that because the underlying calculations set forth on page twenty-four of Appendix I were not printed and were not made available to MCDD's attorney, Mr. Sternke, they could not have known of the Corps' assumptions about MCDD's ability to gravity drain. Pls.' Br. at 15.

The pump station of MCDD discharges into Pool 22 of the Navigation Project, just south of Lock and Dam 21, at Mississippi River mile 321.7. Tr. at 1635-1636 (testimony of Mr. Klingner). MCDD's gravity drain is five feet high, located at 456.5 MSL at its bottom and at 461.5 MSL at its top. Tr. at 1641:13-22 (testimony of Mr. Klingner). House Document 135 states that "[g]ravity drainage was possible before pool No. 22 was established [near MCDD] on the average of about 70 percent of the year . . . [and] is possible during pool operation periods for practically the same time." JX 14 at JA0166. Mr. Klingner, however, testified that a review of the Corps' tailwater gauge readings for Lock and Dam 21, which is three miles from MCDD's gravity drain culvert, Tr. at 1753:18-19, indicates that MCDD could gravity drain in the years 1939 to 1948, the ten-year period of study on which the Corps relied in House Document 135, only about fifty-four percent of the time due to the high tailwater in Pool 21, Tr. at 1653:20-23. Mr. Chris Roberts, a farmer in MCDD, Tr. at 1763:1,18, testified that, based on his review of the Corps tailwater gauge readings at Lock and Dam 21 during the period from 1965 to 2000, see Tr. at 1782:21-1783:10 (describing how he obtained records of the readings), MCDD could gravity drain only about twenty to twenty-one percent of the time, Tr. at 1782:19-23; Tr. at 1808:12-17 (agreeing that the gravity drainage was possible only twenty to twenty-two percent of the time).

Defendant argues that the alleged error in House Document 135 concerning the estimated gravity drainage capacity of seventy percent for MCDD, see JX 14 at JA0166, was known to plaintiffs several decades before the filing of this action. Def.'s Br. at 6-7. Mr. Roberts, who has farmed within MCDD since 1973, testified that MCDD has not been able to gravity drain since he bought property in the drainage district in 1973. Tr. at 1763:20-24; 1787:22; 1788:1. Moreover, plaintiffs' expert, Mr. Klingner, testified that, based on his analysis of the tailwater gauge readings at Lock and Dam 21 and at Lock and Dam 22 during the years from 1939 to 1948, the ten-year period of study on which the Corps relied in House Document 135, and during the years 1994 to 2003, a more recent ten-year period of study, he saw a reduction in MCDD's gravity drainage operations, Tr. at 1657-59, and noted that MCDD has not been able to gravity drain seventy percent of the time since the inception of the Navigation Project in 1940, Tr. at 1658:2-6. Defendant contends that MCDD's failure to sue within six years of first experiencing the alleged reduction in gravity drainage capacity makes its current claim time-barred. Def.'s Br. at 6-7.

The Corps' assumption regarding MCDD's ability to gravity drain an estimated seventy percent of the time was explicitly stated in House Document 135. See JX 14 at JA0166. Based on the availability to plaintiffs of the gravity drainage estimate for MCDD, as set forth in House Document 135 more than thirty years ago, and based on the testimony of Mr. Roberts, a farmer in the drainage district, that MCDD has not been able to gravity drain since 1973, the court finds that plaintiffs were aware or should have been aware of MCDD's diminished ability to gravity drain more than six years prior to filing this suit. See Boling, 220 F.3d at 1370 (stating that a takings claim accrues when plaintiffs were aware or should have been aware of all events fixing the government's alleged liability). Accordingly, plaintiffs' takings claim on the issue of gravity drainage is time-barred.

3. Levee Erosion

Plaintiffs argue that House Document 135, which provided the authority for the releases, addressed excess seepage but did not address "any taking of a flowage easement and/or damage caused to the levees by erosion or flooding." Pls.' Br. at 20. Plaintiffs further argue that "HCDD3 has suffered erosion damage to its levee above the level [up to which] it granted a[] [flowage] easement [to the Corps] in 1939" for the operation of the Navigation Project. Id. at 23. Plaintiffs assert no levee erosion claim on behalf of MCDD. It is undisputed that the levee in MCDD is in good repair. See Tr. at 2524:25-2525:3 (testimony of Mr. Ports stating that "[t]hose levees are in very good to excellent shape . . . [with] no . . . evident problems[] . . . whatsoever"). Plaintiffs' evidence at trial concerning the levee erosion claim focused exclusively on HCDD3.

Defendant argues that the uncontradicted testimony at trial establishes that the maintenance of the HCDD3 levee was--and was known by plaintiffs to be--the responsibility of the drainage district. Def.'s Br. at 7; see JX 123 (Letter from the Corps to HCDD3 of 2/12/74, at 2, stating that "[t]he repair of the riverside slope and slope protection work [on the HCDD3 mainstem levee] is considered to be normal maintenance to be accomplished by local interests"); DX 156 (Memorandum from the Corps to the file of 12/14/60 recording telephone conversation in which the Corps advised HCDD3 that the 1961 releases did not transfer ownership or confer maintenance responsibilities on the Corps); Tr. at 716:5-8 (testimony of Mr. Munson stating that, based on his understanding, HCDD3 is responsible for maintaining its mainstem levee).

Defendant further argues that the erosion of the HCDD3 mainstem levee has been evident for years. Def.'s Br. at 8. Mr. Munson testified that, as a young man doing contracting work for HCDD3, he first noticed levee erosion in the 1960s and 1970s, Tr. at 711:6-13, and explained that the levee was not repaired because of the cost, Tr. at 715:9-

12. Mr. Pruett testified concerning correspondence between the Corps and HCDD3 during the 1970s regarding erosion of the HCDD3 mainstem levee. Tr. at 888:25-903:25; see also JX 115 (Letter from the Corps to HCDD3 of 4/7/71 urging HCDD3 to repair "localized minor erosion and debris damage" observed on HCDD3's levee); JX 116 (Letter from the Corps to HCDD3 of 4/10/72, at 1, noting "the continued deplorable condition" of the HCDD3 levee system); JX 123 (Letter from the Corps to HCDD3 of 2/12/74, at 1, noting erosion caused by "current and wave wash action"); JX 124 (Letter from HCDD3 to the Corps of 5/15/74, at 1, requesting funding for levee repair and the cutting of weeds and brush on top of the levee). Mr. Robb testified that he understood that the HCDD3 levee had been in disrepair for almost thirty years, Tr. at 1433:21-23, and that he was aware of levee erosion when he purchased land in HCDD3 in 1988, Tr. at 1433:21-25; 1434:3-22.

The court agrees with defendant that the evidence at trial establishes that the erosion of the HCDD3 levee was actually observed by plaintiffs, was known by plaintiffs and was well-documented several decades before plaintiffs filed this action. Because both the erosion of HCDD3's levee and the Corps' refusal to accept any responsibility for its repair were certain, see Boling, 220 F.3d at 1371 (stating that a taking claim accrues once it is certain that a gradual process will result in a permanent taking), plaintiffs' takings claim for the erosion of the HCDD3 levee accrued many more than six years before the filing of this action and is time-barred.

C. Merits of Plaintiffs' Takings Claims

Even if plaintiffs' claims were viewed as being viable in 1996,[18] when this case was brought, plaintiffs have failed to carry their burden of establishing that the Corps' operation of the Navigation Project took their property. The Fifth Amendment to the United States Constitution provides, in part, "nor shall private property be taken for public use, without just compensation." U.S. Const. amend. V. Here, plaintiffs have alleged the taking of their property, specifically, the diminution in value of their farmland due to the excess seepage, inability to gravity drain and levee erosion caused by the Corps' operation of the Navigation Project. Pls.' Br. at 22-23. The Court of Claims has stated that in such cases, where the "evidence [is] of a highly technical nature involving geotechnical, hydrologic, hydraulic, geological and climatic matters," the testimony of experts is particularly appropriate. Loesch v. United States, 645 F.2d 905, 914 (Ct. Cl. 1981). Accordingly, in addressing the merits of plaintiffs' takings claims, the court focuses on the trial testimony of the parties' experts regarding the manner by which each of plaintiffs' property interests were allegedly taken.

[18] See supra note 16.

1. Excess Seepage

Plaintiffs assert that the fact that water is seeping onto the land in HCDD3 from the Corps' Navigation Project is "explicitly admitted" in House Document 135. Pls.' Resp. Br. at 11. House Document 135 states:

> Seepage into a leveed drainage district occurs when river levels are higher than the water table in the district. Increased seepage occurs when pool levels are higher than open river levels under the corresponding flow in the river. For the purpose of this report, rates of seepage have been determined for each district under various heads from pumping records during prolonged periods of no rainfall. . . .
>
> . . . Increased costs due to the navigation pools are considered applicable chiefly to pumping. Any increase in cost in the remaining items of operation and maintenance costs [roads and bridges, ditches, levees, commissioner expenses, and office expenses] was considered minor or indeterminable.

JX 14 at JA0145-46.

Plaintiffs contend that the estimated increase in pumping costs to the drainage districts as a result of seepage from the Navigation Project, the most significant impact of the Navigation Project in the view of the Corps, was grossly understated in House Document 135. See Pls.' Br. at 43 ("[T]he only volume number cited by reference to House Document 135 . . . is grossly in error."). For HCDD3, House Document 135 estimates "[t]he average annual increased pumpage . . . to be 2,824 acre-feet" and attributes that volume of increased seepage entirely to Pool No. 18 of the Navigation Project. JX 14 at JA0161. In connection with these estimate, House Document 135 references page seventeen of Appendix I, a document that is "[n]ot printed" according to the accompanying footnote. Id. at JA0161 & n.1. For MCDD, House Document 135 reports "no increased seepage" from the Navigation Project, but estimates the "[a]verage annual normal pumpage at increased lift . . . to be 2,345 acre-feet." Id. at JA0166. In connection with this estimate, House Document 135 references page twenty-four of Appendix I, a document that is "[n]ot printed" according to the accompanying footnote. Id. at JA0166 & n.1.

Plaintiffs argue that the seepage estimates in House Document 135 are contradicted by the data contained in the appendices to the House Report. Pls.' Br. at 43. Plaintiffs assert, in particular, that the underlying pumping plant records on which the

Corps relied in creating Appendix I, PX 112, and HCDD3's operation and maintenance costs and operating data from 1942 to 1946 as reflected in Appendix II,[19] JX 9, do not support the seepage estimates made by the Corps in House Document 135. See Pls.' Br. at 43-44.

Pointing to the Corps' calculations reflected in Appendix I, plaintiffs contend that the gravity drain intake bay elevations on which the Corps based its calculations are wrong because such elevations would keep the water too high in the drainage districts for farming in the spring. Pls. Br.' at 44; see also Tr. at 673-74 (testimony of Mr. Munson). Plaintiffs assert that a comparison of the data in Appendix I with actual measurements from the drainage districts documented by the Corps and submitted to Congress in the 1947 revision to House Document 34 reveals the errors in Appendix I. Pls.' Br. at 46. Compare PX 112 (Appendix I) with JX 9 (War Dep't Corps of Eng'rs, Operation and Maintenance Costs and Operating Data for Drainage District Studies Accompanying Report Reviewing Damages to Levee and Drainage Districts on the Mississippi River as Reported in R. & H. Committee Document No. 34, 75th Congress, 1st Session (1947)) (Appendix II).

Appendix I to House Document 135 is a portion of the Corps' report on damage caused by the Navigation Project to levee and drainage districts. Appendix I contains pool operation periods, computations of quantities, and seepage, fuel and power curves for the Navigation Project. See PX 112. Page seventeen of Appendix I is a chart reflecting the Corps' computation of damages for HCDD3 for future average annual increased quantities of seepage and pumpage attributable to the operation of the Navigation Project. Id. at 17. For each month of the year, the chart details the average water surface elevations at the midpoint mile post along the Mississippi River for Pool 18 in both open river conditions (without the Navigation Project) and controlled river conditions (with the Navigation Project in operation).[20] Id. at 17. Also under the heading of average water surface elevations, the chart details the water surface elevations at the intake bay of the pumping plant for each month of the year. Id.; Tr. at 2350:19-22 (testimony of Dr. Schwartz). Under the heading of increased seepage, the chart reflects

[19]This data was previously submitted to Congress as part of the 1947 revision of House Document 34. See Pls.' Br. at 46; PX 112.

[20]Column 1 and Column 3 of the chart reflect "the river elevation at the nine-foot navigation pool at the midpoint of the district" in open river and closed river conditions, respectively. Tr. at 2350:15-17 (testimony of Dr. Schwartz); PX 112 at 17. Column 2 of the chart reflects the average water surface elevation in open river conditions at river mile post 411.6, opposite the gravity drain outlet. PX 112 at 17.

the average seepage head[21] and inflow rate in open river and controlled river conditions for each month of the year. PX 112 at 17. Also under the heading of increased seepage, the chart shows total incremental seepage, the amount of incremental seepage removed by gravity and the net amount of incremental seepage estimated for each month of the year. Id. The chart has an additional heading for normal pumpage, under which normal precipitation run-off and normal run-off by gravity are estimated for each month of the year. Id.

Page twenty-four of Appendix I is a chart reflecting the Corps' computation of damages for MCDD of future average annual increased quantities of seepage and pumpage attributable to the operation of the Navigation Project. Id. at 24. It is configured similarly to the chart for HCDD3. Compare id. at 24 with id. at 17.

a. Confirmation of the Corps' Calculations in Appendix I

In evaluating the Corps' estimate of annual increased pumpage of 2824 acre-feet for HCDD3 due to the Navigation Project, as reported to Congress in House Document 135, plaintiffs' civil engineering expert Mr. Klingner examined district pumping records, took field measurements, and performed calculations and comparisons with other drainage districts. Tr. at 1550-51 (testimony of Mr. Klingner). Mr. Klingner testified that he compared the Corps' estimate, which he referred to as the "settlement seepage rate," to the seepage calculation performed by his engineering firm, Klingner and Associates, in 1997 during a dry period of time. Tr. at 1554:22-1555:11, 1559:9-14; PX 25 (Klingner and Associates, P.C., Engineer's Report on Estimates of Seepage Due to Locks and Dams (Jan. 1997). The 1997 Klingner and Associates' seepage calculation was based on a field test by "draining down the ditches [at the pump bay] in the drainage district and . . . wait[ing] to see how much time it took for the district to recover [the water elevation in the pump bay]." Tr. at 1556:5-16 (testimony of Mr. Klingner). The amount of water removed from the drainage district during this time was determined with information about the pump capacity of the pump station. Tr. at 1556:18-24. The field observations were compared with formulas used by the Corps in this area to determine seepage. Tr. at 1557:2-9. The amount of seepage in HCDD3 calculated by Klingner and Associates was approximately 10,674 acre-feet. Tr. at 1557-58. This calculation slightly exceeded the Corps' estimate of 9082 acre-feet as the total amount of incremental seepage attributable to the Navigation Project documented in Appendix I, page seventeen. See PX 112 at 17.

[21]Head is difference between the water elevation on the river side of the drainage district compared to the water elevation within the district. Tr. at 1562:15-1563:18 (testimony of Mr. Klingner).

Mr. Klingner testified that he personally performed a second pump test in 2001 to calculate the rate of seepage into HCDD3 from the Navigation Project. Tr. at 1586:7-10, 1607-08. Using a conservative methodology, which included subtracting any effects of rainfall and averaging the seepage rates calculated over two dry periods of time, specifically August and November 2001, he calculated a seepage rate of 9839 acre-feet per year attributable to the Navigation Project, Tr. at 1607-09, a calculation even more comparable to the Corps' estimate of 9082 acre-feet documented in Appendix I, page seventeen. See PX 112 at 17. Mr. Klingner did not consider the ability of the drainage district to gravity drain because HCDD3's gravity drain was closed at the time of his study. Tr. at 1609:3-21.

Effectively confirming the Corps' seepage estimate for HCDD3, Mr. Klingner stated that he had no concern about "the geotechnical part of the seepage" calculation performed by the Corps and reflected in Appendix I because the two pump tests that his engineering firm performed "confirmed the seepage rate [calculated by the Corps because the results of his firm's tests] match[ed] very closely . . . [with] what the Corps ha[s] [in Appendix I] as water coming in [to the district from the Navigation Project]." Tr. at 1586:7-17. Rather, he explained, he questioned the Corps' future projections regarding the water elevations in HCDD3's drainage ditches, which were higher than the levels at which the district can operate for agricultural purposes. Tr. at 1586-87.

Mr. Klingner's conclusions regarding seepage into HCDD3 were confirmed by defendant's geotechnical engineering expert, Dr. Paul Schwartz. Dr. Schwartz testified that, after reviewing the methodology of the Corps' computations in the House documents regarding increased seepage into the drainage districts, he determined that in preparing the computation of damages for each drainage district in Appendix I, the Corps used actual field pumping tests and records to "establish[] the influence of the subsurface profile and the static head" and thereby prepared a reliable estimate of seepage into the drainage districts from the Navigation Project. See Tr. at 2353-54. He opined that the Corps used a standard of care that is generally accepted in the field of geotechnical engineering in the preparation of the estimated damages documented in Appendix I. Tr. at 2353-54. Dr. Schwartz documented his review of the Corps' documents and House Documents 34 and 135 in a report dated December 2001. Tr. at 2346-47; see also DX 4 (Paul H. Schwartz, Henderson Co. Drainage District No. 3 Nine Foot Channel Litigation Review of Seepage Analyses (Dec. 14, 2001)).

Dr. Schwartz further testified that he performed an additional analysis of plaintiffs' seepage claims in this case by "investigat[ing] the exit point [within the drainage districts] of the seepage coming in from the nine-foot navigation pool [under the levee]" and that he prepared a report on his findings in 2003. Tr. at 2362:18-2363:12. As part of his

analysis, Dr. Schwartz examined the groundwater level measurements obtained by the Corps from observation wells installed in the HCDD3 fields,[22] and considered the Corps' conclusion expressed in House Document 135 that the groundwater level in HCDD3 fluctuated with rainfall and did not extend much past the land side of the levee. Tr. at 2363-64. To evaluate the conflicting claims in this case between plaintiffs and the Corps regarding seepage, Dr. Schwartz installed, with the assistance of a surveying firm, observation wells in the district to measure the groundwater tables in HCDD3. Tr. at 2368:8-17.

The observation wells were installed at designated points reflecting various topographical considerations and soil conditions along the mainstem levee and the diversion levee (located near the Henderson River). See Tr. at 2369-72. Dr. Schwartz testified that traverse (survey) lines were run down the centerline of the mainstem levee and the diversion levee. Tr. at 2369-70. He further testified that thirteen cross sections were run perpendicular to the traverse lines, seven along the mainstem levee and six along the diversion levee, and that observation wells were installed at certain locations on the cross sections to measure the groundwater table coming beneath the levee from the Navigation Project so that the exit point of that seepage within the drainage district could be determined.[23] Tr. at 2369-74. Dr. Schwartz observed "that the exit point of the seepage was within the sloughs[24] and the drainage district landward of the levee and that the . . . elevated groundwater table from the nine-foot pool did not extend beneath the agricultural field." Tr. at 2375:7-11. He stated that "once you got beyond the land side of the toe of the levee up to 450 feet away, the increase in the water table from the nine-foot channel had dissipated [and] [t]he drainage ditches had collected the seepage."[25] Tr. at

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[22]Dr. Schwartz explained that an observation well or piezometer "is a pipe [with slots in it] that is drilled down into the sands that underlie the levee." Tr. at 2364:8-11.

[23]In particular, Dr. Schwartz placed observation wells at the top of the levee, on the land side toe of the levee and on the landward side of the levee. See Tr. at 2373:8-17. The term "toe" refers "the bottom of the levee . . . where the constructed part of the levee meets the . . . pre-existing ground. And [the levee has] a toe on the inside and on the outside." See Tr. at 2521:18-24 (testimony of Mr. Ports). "Toe" sometimes appears in the transcript as "tow." The court revises "tow" to "toe."

[24]"Slough" also appears in the transcript and in various exhibits as "slew" and "slue." For uniformity throughout the opinion, the court uses "slough."

[25]From the observation wells, Dr. Schwartz drew four conclusions: (1) that the groundwater table is essentially level to a maximum of 450 feet landward of the levee center line; (2) that the seepage exit point did not extend beneath any landward fields; (3) that the measured

2375:17-21.

Dr. Schwartz opined that, based on his document reviews, his site inspections and the well monitoring activity that he had supervised,

> the excess seepage computed by the Corp[s] in . . . House [D]ocument[] 34 was about 9,000 acre feet per year [, a seepage rate established by the Corps during its ten-year study period from 1938 to 1949, which Dr. Schwartz felt] . . . was a reasonable number[.] [B]ased upon the field work of the observation well data, [he] concluded that the surcharge to the groundwater table from . . . the nine-foot navigation pool, didn't extend beyond 450 feet from the land side to[e] of the levees and in fact, was collected by the drainage ditches and the natural [sloughs] in that area and that the groundwater table . . . where [he] measured it [(beneath the agriculture fields)], was three to five feet below the ground elevation.

Tr. at 2382:6-17. Dr. Schwartz acknowledged on cross-examination, however, that he decided not to install any observation wells in the middle area of HCDD3 because, in his initial analysis of seepage into the drainage district, he did not believe that there would be any need for monitoring wells in the fields in the middle of the district. Tr. at 2438-39. He explained that if the well readings he obtained had shown that seepage extended further into the district, he would have installed more observation wells. Tr. at 2438:25-2439:2.

The testimony of both Mr. Klingner and of Dr. Schwartz, based on their independent examinations of seepage into HCDD3, confirmed the Corps' seepage calculations documented in Appendix I and reported in House Document 135. See PX 112 at 17; JX 14 at JA0161.

Plaintiffs' expert Mr. Klingner testified that he did no seepage studies for MCDD. Tr. at 1720:25-1721:4. Defendant's expert Dr. Schwartz testified that he conducted a site visit to MCDD in August 2003 during a period of low rainfall and performed an inspection of the intake bay of the pumping plant and the field tile exits into the drainage ditches. Tr. at 2386:24-2387:6. He recorded his observations on a aerial photograph and took other photographs during his site visit. Tr. at 2387:6-8; see DX 3 (Paul H. Schwartz, Geotechnical Report on Seepage Claim, App. C (Oct. 3, 2003) (photographs)). As

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groundwater table beneath the land side toe of the levee and the ditches and the sloughs was from three to seven feet below the elevation of the landward fields; and (4) that an outward gradient was coming from the field to the drainage districts. Tr. at 2381:12-23.

reflected in the photographs included in his report, Dr. Schwartz noted the absence of effluent from the relief well surrounding MCDD's pumping plant and explained that a relief well is installed around a pumping plant in the sand foundations of the land to relieve seepage pressures and prevent the formation of water boils in the intake bay. Tr. at 2387-88. He also pointed to an eastern slough that runs along the mainstem levee and forms the main drainage area, draining from both the uplands (levee area) and the district and exiting into the intake bay of the pumping plant. Tr. at 2389. He testified that there was no flowing water in the slough and concluded that "the land side to[e] of the levee is dry." Tr. at 2389:19-25. He also stated that he observed no flow into the ditches from the outlets of the drainage tiles in MCDD. Tr. at 2390:10-14. As evidence of the lack of seepage into the drainage district, he pointed out that the farmers in MCDD farm right up to the levee. Tr. at 2390:19-21. He did acknowledge that he observed some water backed up from the tailwater of the pumping plant but that he observed no flow in the drainage ditch leading into the intake bay or forebay of the pumping plant.[26] Tr. at 2389-90. He also acknowledged that he saw a small amount of seepage, which he described as "just a trickle . . . [that] disappeared," in the two horizontal drainage ditches, forming an I-beam shape through the center of the drainage district. Tr. at 2391:17-19.

Dr. Schwartz also reviewed the Corps' documents regarding seepage estimates for MCDD and concluded that the methodology used to compute seepage was consistent with good "geotechnical practices and principles." Tr. at 2392:16-20. Based on his site visit and his review of the Corps' seepage estimates, Dr. Schwartz opined that there was no seepage into MCDD from the Navigation Project. Tr. at 2387-90; 2392:22-23.

The unrefuted testimony of Dr. Schwartz regarding seepage into MCDD confirmed the Corps' seepage estimate for MCDD documented in Appendix I and reported in House Document 135. See PX 112 at 24; JX 14 at JA0166.

The parties' expert testimony confirming, by independent examination, the seepage estimates on which the Corps based its recommended settlement payments to the drainage districts rebuts plaintiffs' claim that the seepage estimates in House Document 135 are understated and inconsistent with the calculations contained in the appendices to the House Report and the underlying records obtained from the drainage districts. See Pls.' Br. at 43-44. Plaintiffs' own expert Mr. Klingner acknowledged, during questioning

[26] At a pumping station, the "bay is where the water collects so the pumps can suck it up and pump it out the other side. The intake bay is where the pumps suck in the water [from the inside of the levee andxd pump it to the outside of the levee]." Tr. at 244:9-12; 245:4-9 (testimony of Mr. Crane). The terms "intake bay" and "forebay" are used interchangeably. See Tr. at 2389-90 (testimony of Dr. Schwartz).

at trial, that, at the time that the Corps performed its ten-year study on the effects of the Navigation Project, HCDD3 was using its gravity drain system to remove water from the district. See Tr. at 1695-97. This testimony of plaintiffs' own expert indicates that, contrary to plaintiffs' claim, the Corps' recommendation regarding gravity drainage was consistent with the drainage district's own records at that time.

Mr. Klingner also acknowledged, upon further questioning, that the elevations at which the drainage districts maintain their pumping plant intake bays are determined by the drainage district commissioners "for farming purposes." Tr. at 1695:25-1696:7. This testimony also contradicts plaintiffs' claim that the Corps' recommendation regarding the water elevation at the pumping plant intake bay was inconsistent with the drainage district's own practices or records. Contrary to plaintiffs' assertions, the evidence presented at trial does not show excess seepage in the drainage districts beyond what the Corps estimated many years ago. Rather, the evidence corroborates the seepage calculations performed by the Corps and reported in 1955 in House Document 135 and reflects independent decision-making by the drainage district commissioners to adjust their pumping plant operations to benefit their farming operations. The court finds that plaintiffs have failed to establish the existence of excess seepage in the drainage districts.

2. Gravity Drainage

House Document 135 defines "[b]locked gravity drainage" as follows:

> [D]rainage which formerly was available when open river stages were lower than the water elevation in the suction bay, but which is now prevented from flowing out of the district because of the higher river levels resulting from pool operation during the same flows that previously produced low river elevations.

JX 14 at JA0145. House Document 135 states that "Pool No. 18 has no effect on . . . gravity drainage" in HCDD3. Id. at JA0160. House Document 135 further states that "[g]ravity drainage was possible before [P]ool No. 22 was established on the average of about [seventy] percent of the year . . . [and] [g]ravity drainage is possible during pool operation periods for practically the same time." Id. at JA0166.

Plaintiffs contend that the Corps "never examined the impact dam tailwater would have on HCDD3's and [MCDD's] ability to gravity drain . . . [and] th[e] issue was not discussed in any of the three . . . [r]eports [by the Corps] to Congress." Pls.' Br. at 16. Plaintiffs further contend that the higher tailwater readings for Pool 19 and Pool 22 caused by the Navigation Project prevent gravity drainage from being a practical

alternative to pumping in HCDD3 and have severely diminished MCDD's ability to gravity drain. Pls.' Resp. Br. at 6-7. Plaintiffs challenge the amounts that the Corps assumed the drainage districts could gravity drain in its reports to Congress. See Pls.' Resp. Br. at 4.

Referring to the monthly pumping records developed by HCDD3's own engineers over the ten-year period between 1939 and 1949 on which the Corps based its recommendations to Congress regarding payments for damages, see JX 58 (containing pumping records of HCDD3 from 1939 to 1949), defendant argues that HCDD3 was using "its gravity drain system to remove water from its lands." Def.'s Br. at 23; Tr. at 1696-97 (testimony of Mr. Klingner). Defendant states that the Corps relied on such data during its study of the drainage districts prior to the preparation of Corps' report to Congress regarding recommended payments for damages caused by the Navigation Project. Def.'s Br. at 23; JX 14 at JA0144 (stating that "[t]hroughout the time that the drainage districts have been studied, plant operators have kept accurate records of pumping periods for each unit" and that "[t]he pumping records for each year . . . are in the form of monthly reports, containing regular daily readings of the intake and discharge bay ga[u]ges, as well as readings of these ga[u]ges whenever pumps are started or stopped"). Defendant reiterates that any complaint that HCDD3 may have had concerning the gravity drainage issue cannot be asserted now because plaintiffs permanently sealed the drain in 1970 or 1971. Def.'s Br. at 5-6.

Defendant also argues that the Corps bears no responsibility for the impact of navigation pool tailwater on Henderson River and HCDD3 because dam 19 rather than dam 18 impacts the water elevations in the Henderson River. Id. at 17. Defendant explains that dam 19 is currently operated and owned by a private power company rather than the Corps. Id.

With respect to MCDD, defendant argues that, "[a]s with the other data gathered in [House Document] 135 . . . the [seventy percent] figure [for gravity drainage] most likely came from the drainage district itself." Id. at 6 n.6. Defendant further argues that MCDD has failed to show "any significant loss of gravity drainage resulting from the Corps' project." Id. at 27.

At trial, the parties presented the following evidence with respect to HCDD3's gravity drain. The HCDD3 gravity drain is a four foot by four foot concrete culvert. Tr. at 573:13-19 (testimony of Mr. Munson). Prior to the closure of HCDD3's gravity drain in 1970 or 1971, see Tr. at 580-81 (testimony of Mr. Munson), the gravity drain culvert discharged into Pool 18 at approximately Mississippi River mile post 411.6, Tr. at 1533:7-20 (testimony of Mr. Klingner); see also PX 45 (1955 Corps map of HCDD3).

The mouth of the Henderson River is located approximately at Mississippi River mile post 410, just below the point of transition between Pool 18 and Pool 19, and discharges into Pool 19. See JX 14 at JA0160 (House Document 135); PX 45 (1955 Corps map of HCDD3); Tr. at 1537:9-13 (testimony of Mr. Klingner). The mouth of the Henderson River is approximately 0.5 miles downstream from lock and dam 18, which controls the elevation of Pool 18. See PX 45 (1955 Corps map of HCDD3). The tailwater gauge for Pool 18 is located just below lock and dam 18 and sits in the upper end of Pool 19, measuring river stage or elevation.[27] Tr. at 1123:23-1124:6 (testimony of Mr. Gretten).

The elevation of the HCDD3 gravity drain inlet is 518.3 MSL. Tr. at 573:15-574:1 (testimony of Mr. Munson). The elevation of the HCDD3 gravity drain outlet is 517 MSL. Tr. at 574:5-10 (testimony of Mr. Munson). The outlet of the HCDD3 gravity drain discharges directly into a ditch leading to the Henderson River. Tr. at 574-76 (testimony of Mr. Munson); see PX 45 (1955 Corps map of HCDD3). The elevation of the Henderson River is approximately 520 MSL. Tr. at 569-72 (testimony of Mr. Munson).

Based on the River Elevation - Duration Profiles contained in the Corps' Master Water Control Manual for lock and dam 19 of the Navigation Project, see JX 43, which indicate "the percentage of time that a particular elevation [at a certain river mile] is equal[ed] or exceeded," Tr. at 1107: 2-11; 1109:9 (testimony of Mr. Gretten), Mr. William Gretten, a civil engineer employed with the Corps nearly twenty-three years, Tr. at 1080-81, testified that the tailwater gauge at Pool 18 exceeded 521.5 MSL fifty percent of the time between 1940 and 1986. Tr. at 1111:14-1112:3; JX 43 at JA0408 (U.S. Army Corps of Eng'rs, Master Water Control Manual, Lock & Dam No. 19 (1996)). Further review of the River Elevation - Duration Profiles indicates that, nearly eighty percent of the time between 1940 and 1986, the tailwater gauge for Pool 18 was approximately two feet above the inlet elevation of HCDD3's gravity drain culvert and approximately three feet above the outlet elevation of HCDD3's gravity drain culvert. JX 43 at JA0408 (U.S. Army Corps of Eng'rs, Master Water Control Manual, Lock & Dam No. 19 (1996)).

Plaintiffs' expert witness Michael Klingner testified that "[t]he elevation of the tailwater from Lock and Dam 18 . . . affect[s] the elevation in the [Henderson] [R]iver as

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[27]The tailwater gauge for Pool 18 is approximately four-tenths of a mile upstream from the mouth of the Henderson River. Tr. at 1251:9-13 (testimony of Mr. Robb). The pool gauge for Pool 18 is immediately upstream of dam 18 and sits in Pool 18. Tr. at 1124:5-6 (testimony of Mr. Gretten). "When the tailwater rises to th[e] elevation that is nearly the same as the [elevation of the] pool," the Corps takes the dam gates for that particular pool out of the water to permit the river to flow naturally. Tr. at 1123:16-22 (testimony of Mr. Gretten).

well." Tr. at 1547:8-11. He further testified that "[a]s that tailwater increases, . . . it backs up into the [Henderson] [R]iver." Tr. at 1547:13-15.

Defendant's expert witness Michael Ports, a civil engineer and professional hydrologist employed with Black and Beach Corporation in Kansas City, Missouri, Tr. at 2490-91, testified:

> The tailwater, downstream from the gravity drain at [HCDD3], is a function of three things. It is a function of the gate settings at dam number 19, and what the backwater is at pool 19. It is a function of the flow coming down the Mississippi River. And three, it's a function of the flow coming down Henderson Creek or Henderson River.

Tr. at 2513:9-15. Mr. Ports stated that "[t]he operation of the lock and dam at [pool] 18 has no impact whatsoever on the tailwater of the gravity drain at [HCDD3]." Tr. at 2514:9-11.

Defendant's expert Kevin Landwehr testified that dam 19 was constructed prior to the Navigation Project by private interests under the Keokuk and Hamilton Water Power Act of 1905 and "has been operated since by [the] successors [of the Keokuk and Hamilton Water Power Company]." Tr. at 2141:21-2142:3. Plaintiffs' expert Mr. Klingner acknowledged on cross-examination that any backwater effect of the Mississippi River on the Henderson River is the result of the amount of flow in the river and the operation of dam 19, which is currently operated and owned by a power company, and not by the Corps. Tr. at 1700-01.

In 1905, Congress authorized the Keokuk and Hamilton Water Power Company to design, construct and maintain a dam across the Mississippi River at Keokuk, Iowa. Act of Feb. 9, 1905, Pub. L. No. 58-65, 33 Stat. 712; see also JX 43 at JA0317, JA0320 (U.S. Army Corps of Eng'rs, Master Water Control Manual, Lock & Dam No.19 (1996)). "[C]onstructed without any government subsidy," the project pre-dated the construction of the Navigation Project. See JX 43 at JA0317 (stating that the Keokuk dam project was completed in 1914). The Keokuk power dam, dam 19, and appurtenant structures, are still privately owned by a successor power company, Union Electric Power Company, and are operated subject to certain regulations of the Secretary of the Army. See id. at JA0309-10, JA0320. The Rock Island District Office of the Corps is charged with responsibility of observing the power company's operations to ensure that the dam is operated in accordance with the regulations published under Title 33, Chapter II of the Code of Federal Regulations, specifically, 33 C.F.R. § 207.310 (2003). Id. at JA0320. The Act authorizing the Keokuk and Hamilton Water Power Company to maintain dam

19 specifically addressed compensation for damages caused by the dam and provided, in pertinent part:

> [C]ompensation shall be made by the said Keokuk and Hamilton Water Power Company to all persons, firms, or corporations whose lands or other property may be taken, overflowed, or otherwise damaged by the construction, maintenance, and operation of the said works in accordance with the laws of the State where such lands or other property may be situated; but the United States shall not be held to have incurred any liability for such damages by the passage of this Act.

Act of Feb. 9, 1905, Pub. L. No. 58-65, 33 Stat. 712, 713. The Act explicitly relieves the United States of any liability in connection with the construction, operation or maintenance of the dam.

The undisputed evidence at trial established that the impact of the dam 18 tailwater on HCDD3's gravity drainage system is caused by the operation of dam 19 in Pool 19. Operated by private interests, dam 19 is not part of the Corps' Navigation Project and under the express terms of the Act of February 9, 1905 authorizing the construction, operation and maintenance of the dam, the United States bears no liability to any person "whose land[] or other property may be taken, overflowed, or otherwise damaged by the construction, maintenance, and operation of the said works." Act of February 9, 1905, ch. 566, 33 Stat. 712, 713. Accordingly, plaintiffs have failed to establish a claim against the Corps for the taking of HCDD3's gravity drainage system through tailwater inundation from dam 19.

With respect to MCDD's diminished ability to gravity drain, Mr. Chris Roberts, a farmer in MCDD for nearly thirty years, Tr. at 1762-63, 1765, testified that, based on his experience and contrary to the Corps' representation in House Document 135, MCDD could not gravity drain seventy percent of the time, Tr. at 1788-89. In particular, Mr. Roberts testified that, in his experience, MCDD could not gravity drain seventy percent of the time during the period of the year from March through July. Tr. at 1788-89.

Mr. Roberts explained that MCDD has "a system of ditches that come[s] down through [the] district and come[s] into . . . what [is] call[ed] a pump bay [or gravity drain] . . . . And [MCDD] ha[s] [a] gravity gate that goes under the lev[ee] from this pump bay into the Fabius River which is just slightly above the Mississippi River." Tr. at 1785:5-10. The pump bay or gravity drain is a five-foot by five-foot concrete culvert. Tr. at 1784:7-8. The elevation at the bottom of the gravity drain is 456.5 MSL, and the elevation at the top of the gravity drain outlet is 461.5 MSL. Tr. at 1783-84. Mr. Roberts

testified that the gravity drain works when the river level is below 461.5 MSL. Tr. at 1784:22-24. Stating that the outlet to MCDD's gravity drain is located approximately three miles from lock and dam 21, Tr. at 1783:14-16, he further testified that, based upon his review of the Corps' website, which includes the daily river tailwater levels affecting MCDD, he estimates that MCDD can gravity drain only twenty to twenty-one percent of the time, Tr. at 1782-83; see also JX 44 at JA0519 (U.S. Army Corps of Eng'rs, Master Water Control Manual, Lock & Dam No. 22 (1996) (showing River Elevation-Duration Profiles)); JX 51 (Daily Stream Ga[u]ge Readings for the Upper Mississippi River at Lock & Dam 22 Pool, 1950-Present [2000]); JX 52 (Daily Stream Ga[u]ge Readings for the Upper Mississippi River at Lock & Dam 21 Tailwater, 1950-Present [2000]); PX 106 (U.S. Army Corps of Eng'rs Rock Island Dist., Water Level Archives, Mississippi River Basin, Lock & Dam 22, http://water.mvr.usace.army.mil (Jan. 5-6, 2004) (gauge readings from 1936 to 2003)).

Stating that he observed silt and dirt as well as water in MCDD's gravity drain, Tr. at 1785:11-17, Mr. Roberts testified that the water observed in the drainage district "is a lot clearer" than the water found in the gravity drain, and he stated that it is possible that the sedimentation in MCDD's gravity drain is due to backwater from the Fabius River, as impacted by the Mississippi River, Tr. at 1813-14.

Plaintiffs' expert Mr. Klingner testified that, in his opinion, there has been an increase in water elevation in MCDD, Tr. at 1654:4-18, and a corresponding reduction in the ability of MCDD to gravity drain, Tr. at 1659:13-16. Examining daily tailwater readings at lock and dam 21 that are available on the Corps' website and using as his measure a water elevation of 462 MSL, the level at which the district prefers to operate its gravity drain based on the design of its pump station, Tr. at 1654:1-6, Mr. Klingner testified that MCDD was not able to gravity drain seventy percent of the time as stated in House Document 135 but only fifty-four percent of the time, Tr. at 1653:17-23. He further testified that, an examination of the daily tailwater readings at lock and dam 21 during "the most recent [ten] year period of [19]94 to 2003," Tr. at 1651:7-8, showed that MCDD has been able to gravity drain "about [forty-one] percent" of the time, Tr. at 1653:23-25. Mr. Klingner concluded that the factors affecting MCDD's ability to gravity drain are weather (specifically, rainfall), sedimentation in the upper part of the pool, and the tailwater of lock and dam 21. Tr. at 1653-54; 1662:8-16; 1744:8-23.

Defendant's expert Mr. Landwehr, a hydraulic engineer with the Corps, testified that because MCDD is "located at the far upstream reaches of [P]ool 22[,] . . . dam 22 has very little impact on the water level at Marion County" except under low flow conditions. Tr. at 2139:1-4. Stating that MCDD is located approximately twenty miles upstream of the dam, he explained that "the further away you get [] from the impounding structure, the

less effect that dam is capable of producing at that location." Tr. at 2139:5-8. He further explained that "the variations in the upstream portion of the pool much more reflect the natural variations [that] would have [been] seen before the dams." Tr. at 2139:9-11. Although he acknowledged that "[t]here is an impounding effect certainly at low flow conditions that the dam produces in the upstream portion of the pool," he testified that the impounding effect "greatly diminishes as the flow increases in the river." Tr. at 2139:11-14.

Defendant's expert Mr. Ports testified that, during his site visit to MCDD, he took two sediment samples, one from the center of the gravity drainage ditch and the other from the bank of the gravity drainage ditch, to determine the source of the sediments in the gravity drainage ditch. Tr. at 2527:9-23. He described the gravity drain as "a culvert underneath the levee . . . extend[ing] from the . . . intake basin . . . of the pumping station, underneath the levee." Tr. at 2525:22-25. Contrasting the gravity drain at MCDD from the gravity drain at HCDD3, he stated that the MCDD gravity drain "does not travel" and explained that "it is not located underneath the pumping station, but near it." Tr. at 2525:25-2526:2. He further explained that "it goes underneath the levee, and discharges into an outlet ditch" that is an unlined, earthen ditch approximately twenty to twenty-five feet wide and twenty yards long and drains on the river side of the levee into the Fabius chute. Tr. at 2526:2-10. The outlet from MCDD's gravity drainage district into the Fabius River is located approximately a quarter mile from the Mississippi River. Tr. at 1812:20-24 (testimony of Mr. Roberts). Mr. Ports stated that a geotechnical analysis of the samples indicated that both samples, respectively from the bottom and from the side of the gravity drainage ditch, "consisted mostly of black clays, with a little bit of silts [and] [v]irtually zero organic material." Tr. at 2528:1-20. He testified that such composition "is not consistent" with the sediments that are carried by either the Mississippi River or the Fabius chute or "with the material from inside the levee district." Tr. at 2528:9-13. He further testified that because the two samples, respectively from the bottom and from the side of the gravity drainage ditch, are "exactly consistent" with each other, he "conclude[d] that the [gravity drainage] ditch, because it's unlined and not protected, and is subject to different flows in the river, different water levels, is sloughing off into itself and filling itself up." Tr. at 2528:15-20.

Defendant's expert Dr. Kays testified about the soil characteristics in MCDD, Tr. at 2676:2-12, and the sloping topography of MCDD describing "an upland drainage area that drained" into a man-made detention basin located in the central portion of the drainage district, Tr. at 2682:15-24. His testimony that MCDD's excess ground wetness problem was caused by the inherent characteristic of high water retention in MCDD's soil and by rainfall over the district, particularly, by rainfall over the uplands in the western portion of the drainage district draining down into MCDD, and not the operation of the

Navigation Project, Tr. at 2688-89, was unrebutted.

Having heard testimony on the quarter mile distance between the outlet from MCDD's gravity drainage district and the Mississippi River, see Tr. at 1812:20-24 (testimony of Mr. Roberts), cumulative testimony about sedimentation in the MCDD gravity drain, see Tr. at 1785:11-17 (testimony of Mr. Roberts); Tr. at 1662:8-16 (testimony of Mr. Klingner); Tr. at 2528:17-20 (testimony of Mr. Ports), testimony about the geotechnical analysis of the gravity drainage ditch samples, see Tr. at 2528:1-20 (testimony of Mr. Ports), and testimony of Dr. Kays and Mr. Klingner regarding the impact of rainfall and run-off in MCDD, see Tr. at 2688:1-8 (testimony of Dr. Kays); Tr. at 1744:14-23 (testimony of Mr. Klingner), the court finds that the weight of the evidence presented at trial indicates that the weather, MCDD's topography and the inherent characteristics of the soil in MCDD have been the most significant factors affecting MCDD's ability to gravity drain. Plaintiffs have failed to establish that the Navigation Project was the cause of MCDD's inability to gravity drain effectively.

3. Levee Erosion

Plaintiffs' only claim with respect to levee erosion involves HCDD3 and appears to be two-fold.[28] First, plaintiffs attribute the erosion of HCDD3's levee to the removal of the protective barrier formed by several hundred trees on the levee when the Navigation Project was constructed in the late 1930s. See Pls.' Br. at 20-21. Second, plaintiffs attribute the erosion of the HCDD3 levee to the Corps' refusal to assist with maintenance of the levee based on the Corps' position that neither HCDD3's mainstem levee (on the Mississippi River) or its Henderson River levee is necessary to maintain Pool 18 as a navigation pool. See id. at 21-22.

[28]Plaintiffs made no claim for erosion in MCDD. With respect to MCDD, Mr. Ports testified: "There is no erosion. Those levees are in very good to excellent shape. They are well maintained. They are stable, and there are no . . . evident problems[] with them whatsoever." Tr. at 2524:25-2525:3. Mr. Landwehr testified that no areas along MCDD were identified in the bank erosion study because MCDD is "not adjacent to the navigation channel . . . [but is] on the opposite side of an island and a chute [, specifically the Fabius Chute,] from the navigation channel." Tr. at 2181:10-14; see also Tr. at 2179:17-23. He explained that "the nine-foot navigation channel is not producing erosion [in] the Marion County Drainage District because during the low flow conditions under which [lock and] dam 22 is exerting an influence, the water is adjacent to the[] federal refuge lands [that lie between the Marion County levee and the Mississippi River], not the Marion County Drainage District levee." Tr. at 2181:4-14; see also Tr. at 2179:17-23. Plaintiffs did not refute the testimony of either Mr. Ports or Mr. Landwehr regarding the MCDD levee.

Mr. Robb testified that the destruction of the dense area of trees "in front of the [HCDD3] levee on the land that was b[]ought by [the Corps'] easement, [an area approximately] 150 feet to 250 feet wide," Tr. at 1436:3-9, occurred in 1940 and caused minor levee erosion, Tr. at 1436:15-22. He stated that the floods of 1993 and 2001 caused the major damage to the HCDD3 levee. Tr. at 1436:18-19. Mr. Robb explained that, during the flood in 1993, "the winds . . . severely eroded" a section of the HCDD3 levee. Tr. at 1150:9-11. He testified that because "[i]t was beyond our capability to repair" part of the erosion damage caused by the 1993 flood, the levee is now inaccessible to dump trucks. See Tr. at 1151:20-25. Plaintiffs' expert Mr. Klingner acknowledged that, at the time of the 1993 flood event, dam 18 was not in operation. Tr. at 1690:2-24.

Mr. Robb's testimony concerning the tree removal on the riverward side of the levee was corroborated by the testimony of Mr. Kevin Landwehr. Mr. Landwehr, a hydraulic engineer with the Corps, Tr. at 2124:18; 2125:1-5, testified as an expert on levee erosion, among other issues, Tr. at 2133:10-15. Mr. Landwehr acknowledged that dense areas of trees that could potentially break up wind-driven waves from the Mississippi River against the HCDD3 levee were removed in connection with the construction of the Navigation Project. Tr. at 2226-27. Mr. Landwehr stated that bank erosion is a natural process occurring along every river, stream, and creek, and that the natural erosion process "has a potential to be exacerbated by man's activities." Tr. at 2157:11-14.

Mr. Landwehr testified that, during a field survey performed in August 2003 during extremely low flow conditions on the Mississippi River to examine bank erosion, Tr. at 2155:11-14, 24-25, "there were no signs of significant erosion within the range of elevations in which the pool fluctuates when in operation," Tr. at 2158:3-5. Addressing the range of elevations within which Pool 18 operates, Mr. Landwehr explained that

> Dam 18 is operated to maintain a nearly constant water surface elevation upstream–immediately upstream of the dam for all flows that are not capable of producing that nine-foot channel naturally.
>
> It is operated within a half a foot band.
>
> One-tenth of a foot above [the Corps'] target elevation, which has been discussed as 528.0 [MSL], to four-tenths of a foot below. So [the Corps] operate[s] [dam 18 in Pool 18] within a half foot operating band.

Tr. at 2136:4-11. He further explained that, when the Navigation Project is in operation, "the range of water surface elevations that occur along [HCDD3] var[ies] from about one

foot at the downstream [end] up to two f[ee]t at the upstream end." Tr. at 2170:7-10.

Referring to the photograph marked as figure twenty-five in his expert witness report dated September 18, 2003, see DX 6 at 0039, Mr. Landwehr pointed to the vertical difference of approximately twelve feet between the pool elevation in the photograph and the levee to provide perspective concerning the range of pool fluctuation when the Navigation Project is in operation. See Tr. at 2169:15-2170:17. He testified further that "[t]here were obvious signs of distress at much higher elevations, which are only reached during flood flows, during which time the dam is not in operation," and he noted that Mr. Robb had testified about the floods of 1965, 1973, 1993, 1997 and 2001 "as being particularly destructive." Tr. at 2158:6-11.

From the August 2003 field study, Mr. Ports, who conducted the study with Mr. Landwehr, Tr. at 2521:2, observed substantial slope failure "up high on the levee" potentially caused by very strong winds and wave action when the Mississippi River is at very high levels. See Tr. at 2523:2-22. He also observed that the levee "has not been maintained . . . to strict standards for levees" and "is too steep" on both the riverside and the land side when "[i]t should be much flatter." Tr. at 2524:4-9.

Mr. Landwehr's observations were recorded in a series of photographs that were identified and presented at trial. See Tr. at 2158-2178; DX 6 at 0096-0119 (Kevin J. Landwehr, Expert Witness Report, App. E (Sept. 18, 2003)). As Mr. Landwehr testified, the pictures showed a revetment along the entire length of the levee that protects the levee toe against wave wash and other erosive factors. Tr. at 2160:18-21; 2162:16-17; 2165:6-20; 2167:9-25; 2168:6-11. He also pointed to "a lengthy subaqueous bench . . .[with a gently sloping surface" that extends riverward from the bankline, Tr. at 2164:6-18, and "serves to . . . protect against wave action," Tr. at 2159:11-18. Stating that "there was no significant erosion whatsoever on the toe on the lower portion of [the HCDD3] levees," where the revetment is located, Tr. at 2522:3-4, Mr. Ports opined, to a reasonable degree of engineering certainty, "[t]hat the operation of the . . . nine-foot navigation project[] has had no erosional impact on the [HCDD3] levee." Tr. at 2525: 4-15.

Plaintiffs did not refute the testimony of Mr. Landwehr and Mr. Ports regarding the HCDD3 levee. Nor did plaintiffs explain how the tree clearing on the HCDD3 levee by the Corps in connection with the construction of the Navigation Project was inconsistent with the flowage easements acquired in 1939 by the Corps on the riverside of HCDD3's levee, Tr. at 2275:5-8; 2278:1-10 (testimony of Mr. Mattson), specifically conveying to the Corps

the full, complete and perpetual right, power and privilege to overflow

> [certain designated tracts of land], together with the full, complete and perpetual right to clear, cut and remove all brush, timber and other natural and artificial obstructions on said land or in the slack water pool created or to be created by Lock & Dam No. 18 or on the margins thereof which in any way or at any time shall interfere with navigation or the use of the lands and pool for the maintenance and operation of said lock and dam or [tend to render] the pool created thereby inaccessible, unsafe or [u]nsanitary, together with the right to enter upon said land from time to time as occasion may require for the purposes aforesaid, subject to whatever rights the Mississippi River Power Company may have to flood, submerge or otherwise damage through back water, flooding, erosion, ground water, seepage, lack of drainage or obstructed drainage over said land by reason and virtue of the construction, operation and maintenance of the [Navigation Project].

JX 62 at JA0399 (United States v. Certain Lands in Henderson County, No. 2840 (S.D. Ill. June 22, 1939) (order vesting title)) (emphasis added); see also JX 68 (maps from the Corps' Real Estate Division showing the location of the tracts of land along Pool 18 over which the Corps acquired flowage easements in 1939).

The balance of evidence presented by plaintiffs with respect to their takings claim for levee erosion focused on the significance of the HCDD3 levees in maintaining Pool 18 of the Navigation Pool.

Mr. Klingner, plaintiffs' civil engineering expert, testified that, at plaintiffs' request, he performed a calculation to determine what effect the removal of the HCDD3 levees would have on the Navigation Project. Tr. at 1617:15-1618:4. Using base maps that reflected the topograpical elevations of HCDD3 and geological survey maps obtained from the United States Geological Service, Mr. Klingner plotted the inundation area at normal pool and at flood stage. Tr. at 1611:1-13. He testified that without the HCDD3 mainstem levee and the Henderson River levee, "there would be water bypassing lock and dam 18." Tr. at 1615:16-24. Based on the mapping study, Mr. Klingner opined that, within a reasonable degree of scientific certainty, "about [sixty-eight] percent of the district would be flooded during normal pool" absent the levees. Tr. at 1614:20-24.

Defendant's hydraulic engineering expert Mr. Ports refuted Mr. Klingner's conclusion stating that:

> The pools have been in operation for more than [sixty] years with the levees in place. And when the levees have failed, the pools have not been lost.

> Navigation has been able to be maintained and kept. There is no reason to have those levees there in order to maintain the navigation pools.

Tr. at 2530:3-9. Moreover, Mr. Ports challenged each of the four assumptions in Mr. Klingner's mapping study, specifically: (1) that the flow would be steady and gradually varied; (2) that the flow would be one-dimensional; (3) that the flow would be uniform; and (4) that the flow would have a constant fluid density and a stable boundary. Tr. at 2532-36. He testified that "[n]one of the four assumptions hold[s]," Tr. at 2536:2, because this case involves "an unsteady flow problem," Tr. at 2533:3-7, "a classic three-dimensional flow problem," Tr. at 2533:22-23, with non-parallel flow lines and non-uniform flow, Tr. at 2534:7-20, and "heavily sediment-laden" water, Tr. at 2535:6-10. Mr. Ports concluded that Mr. Klingner's calculation "is not appropriate for this . . . analysis [and] . . . doesn't tell you anything." Tr. at 2536:8-9.

The court, however, need not resolve the conflicting testimony with respect to whether the HCDD3 levees were necessary to maintain Pool 18 of the Navigation Project. Plaintiffs' argument concerning the significance of the HCDD3 levee to the maintenance of the Navigation Project effectively reasserts, by implication, that the Corps bears some responsibility for HCDD3's levee maintenance costs. Such claim is a contract claim and is not pertinent to plaintiffs' takings claim. This court has previously held that plaintiffs' contract claims based on the 1961 releases are time-barred. Henderson I, 53 Fed. Cl. at 57.

Whether or not the HCDD3 levees are needed to maintain Pool 18, plaintiffs have failed to establish that the operation of the Navigation Project has effected a taking of the HCDD3 levees by erosion.

As observed during low river flow, a circumstance permitting an optimal view of the condition of the HCDD3 levee, the HCDD3 levee showed no "significant" signs of erosion within the operating range of Pool 18 of the Navigation Project but, consistent with the testimonial evidence concerning the adverse impact of various flood events on the levee, the levee did show "obvious signs of distress" at higher elevations. See Tr. at 2158 (testimony of Mr. Landwehr). Based on the unrefuted evidence presented at trial regarding the pattern of erosion observed on HCDD3's mainstem levee and the conditions of operation of the Navigation Project, the court finds that plaintiffs have failed to show that Navigation Project caused the erosion of the HCDD3 levee.

III. Conclusion

Based on the evidence presented at trial and for the foregoing reasons, the court

has determined that plaintiffs' takings claims were knowable and were known more than six years before filing this action in 1996. Moreover, plaintiffs failed to prove at trial that the Navigation Project caused the seepage, gravity drainage and levee erosion problems of which they have complained in this action. The court determines that "there is no just reason for delay," RCFC 54(b), and directs the Clerk of the Court to enter judgment in favor of defendant as to all claims of Henderson County Drainage District No. 3, Marion County Drainage District, the Estate of Glen J. Romkey, Mr. Howard Pruett, and Mr. and Mrs. John Robb. No costs.

IT IS SO ORDERED.

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EMILY C. HEWITT
Judge