

APPENDICES

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APPENDIX A

Delhi Dam
Project Drawings and Construction Photographs

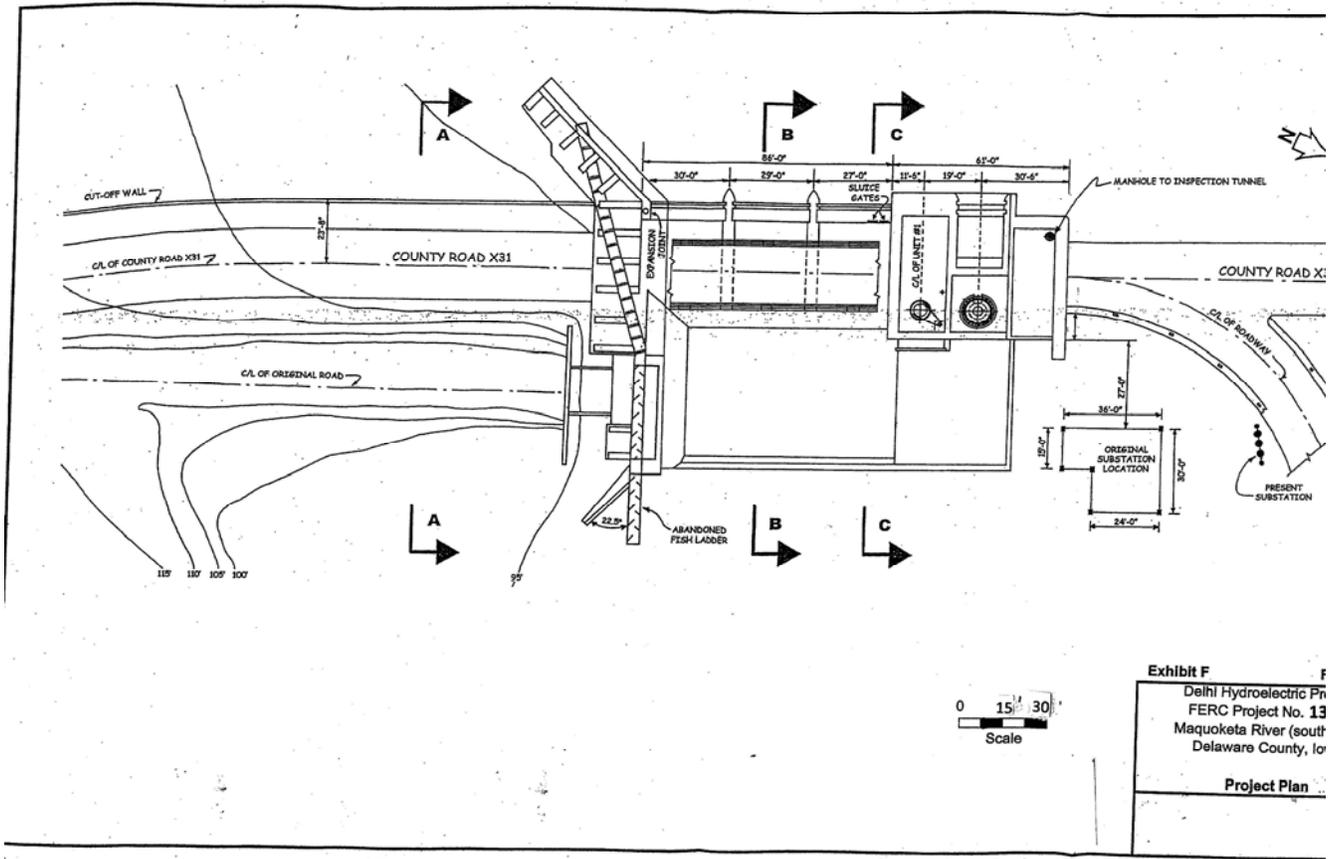


Exhibit F
 Delhi Hydroelectric Project
 FERC Project No. 13
 Maquoketa River (south
 Delaware County, Iowa)
Project Plan

Plan View of Dehi Dam

EXHIBIT F-2 CROSS-SECTIONS OF DAM

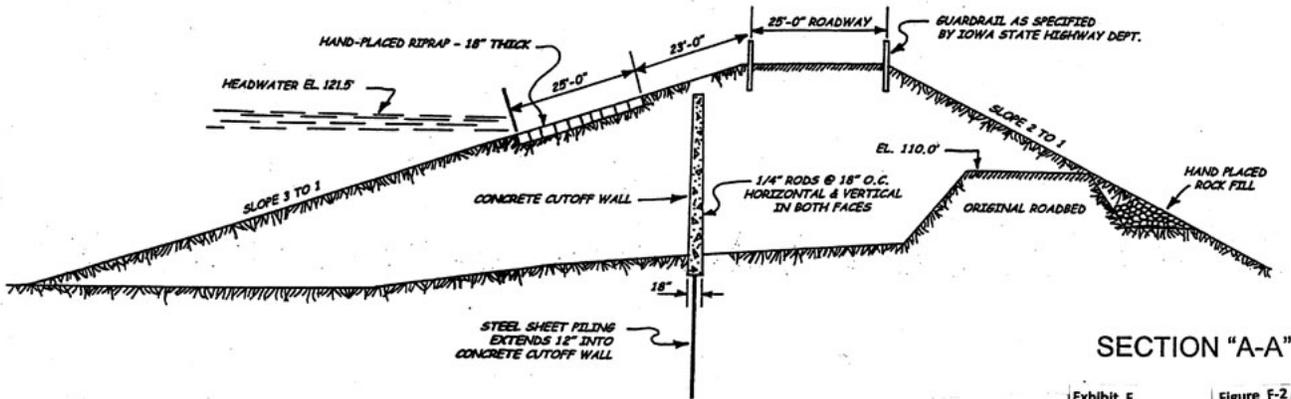


Exhibit F	Figure F-2
Delhi Hydroelectric Project FERC Project No. 13257 Maquoketa River (south fork) Delaware County, Iowa	
Project Plan	

Embankment
Section A-A

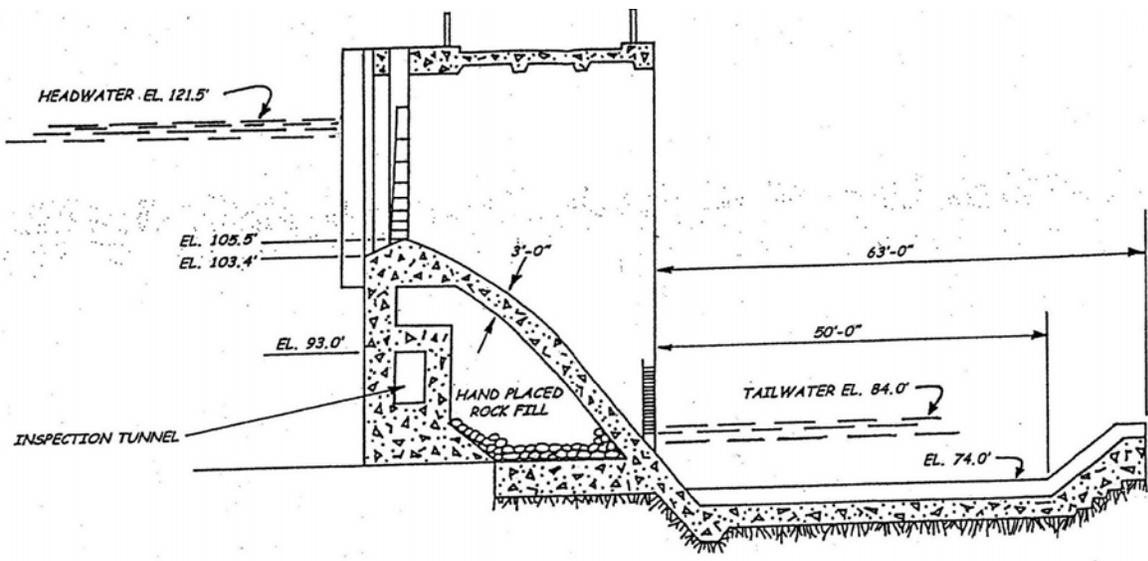
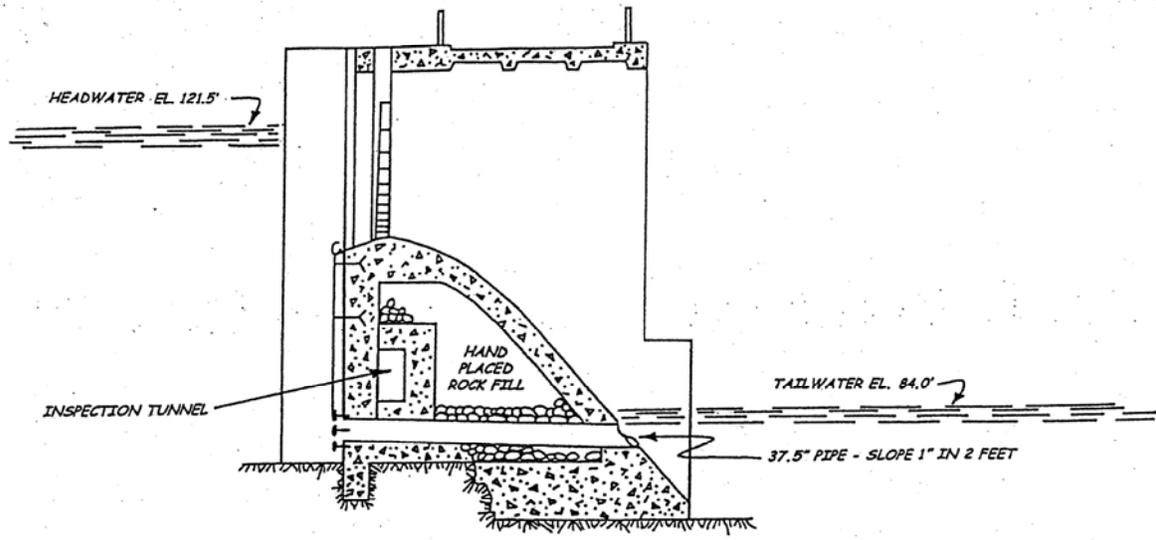


Exhibit F	Figure F
Delhi Hydroelectric Project FERC Project No. 13257 Maquoketa River (south fork) Delaware County, Iowa Cross-section of Dam Section "B-B"	

Spillway
Section B-B

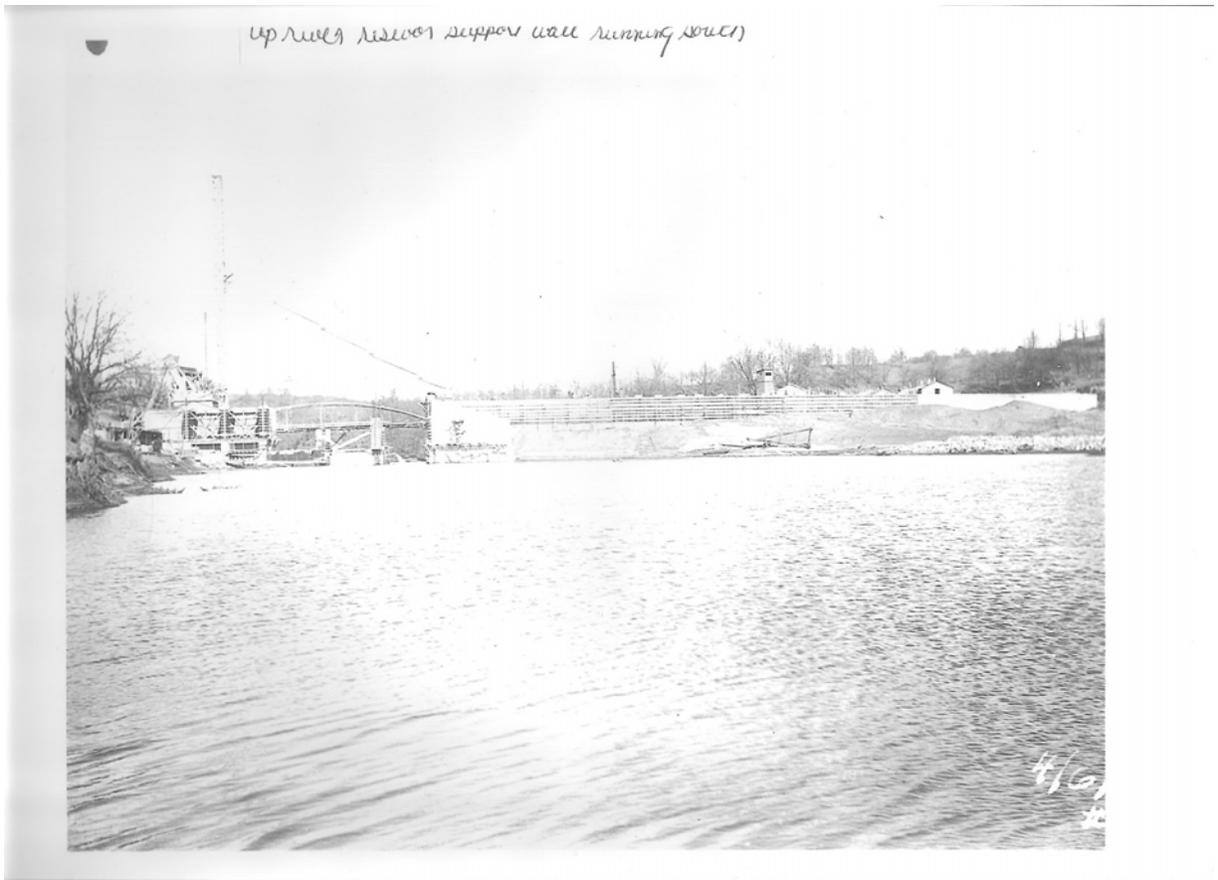


Section "C-C"

0 5' 10'
Scale

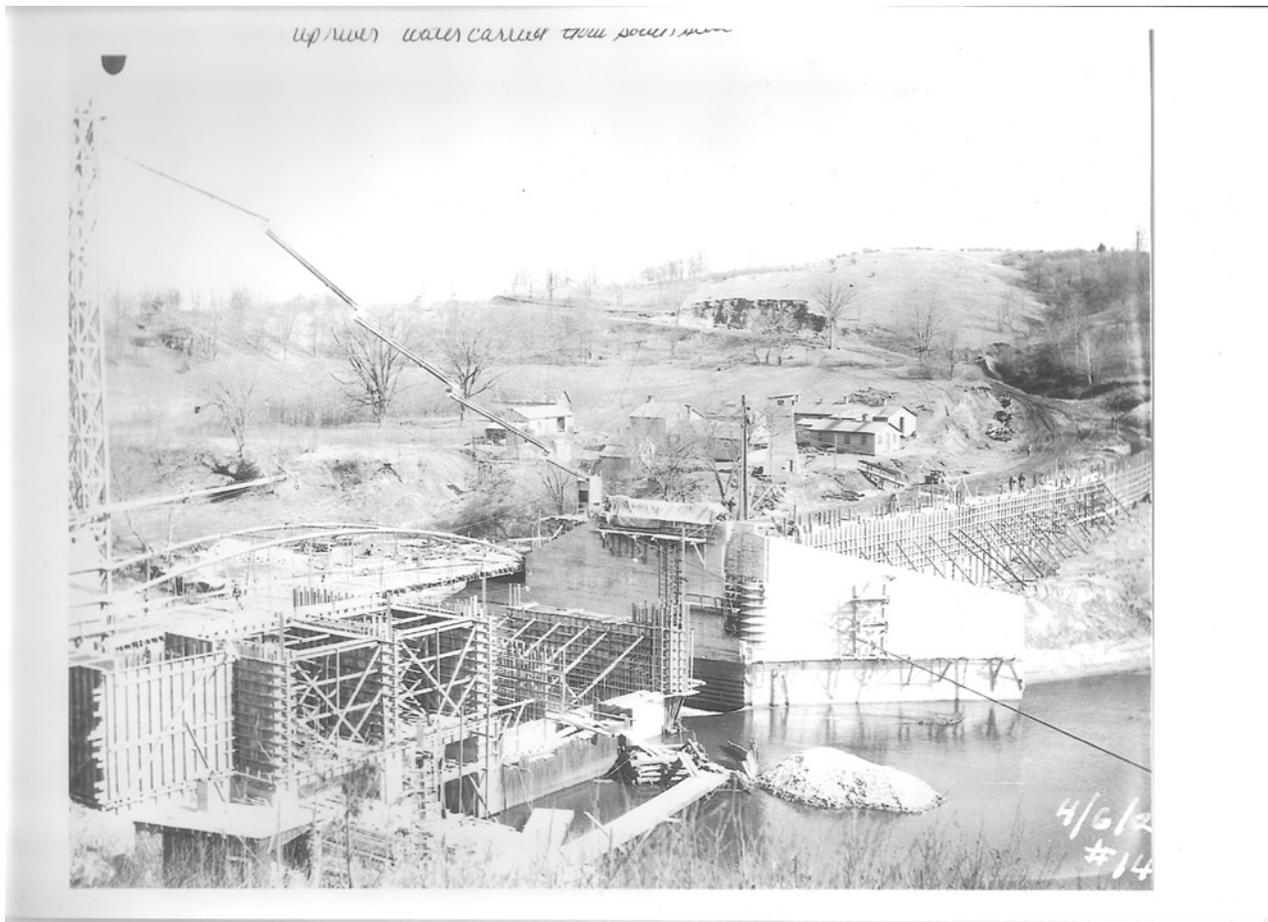
Exhibit F	Figure F
Delhi Hydroelectric Project	
FERC Project No. 13257	
Maquoketa River (south fork)	
Delaware County, Iowa	
Cross-section of Dam	
Section "C-C"	

Spillway
Section C-C



Construction Photograph

Note construction of Concrete Core Wall and right (south) embankment fill



Construction Photograph

**Note Construction of core wall and right (south) embankment fill
Suspected borrow source in background**

Appendix B

Delhi Dam Pre Breach Photographs



Upstream View



Crest of dam from right (south) embankment in area of initial breach (looking north)The double section of guardrail is 16 ft long, with posts spaced about 3 feet apart, the single guardrail sections are 20 ft. long with posts spaced at about 5 ft



Downstream view looking south towards the right (southern) embankment
Note the trees in the section where the initial breach occurred.



Downstream guardrail and crest shoulder in breach area
(Google)



Crest of embankment in breach area
(Google)

APPENDIX C

Photos During the Flood of July 24, 2010
Ongoing deterioration and breach of the Right (South) Embankment

Credits

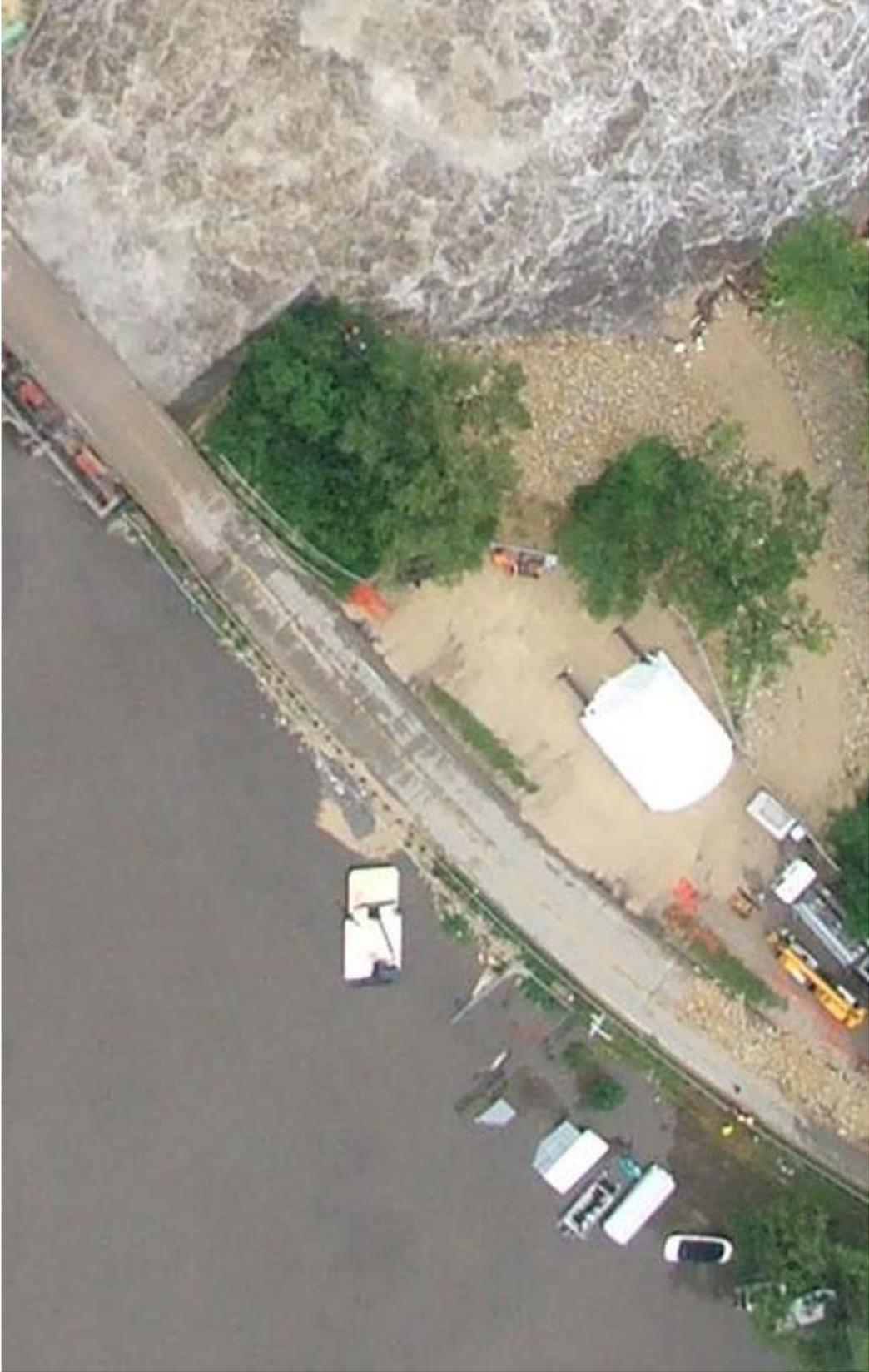
Iowa Department of Natural Resources

Tom McCarthy

CBS News.

Associated Press

Ad others???



Aerial view of right embankment in the area of the breach



Overtopping of left end of powerhouse and left embankment section



Overtopping of left embankment



Aerial view of downstream side
Note Flow



View of right Spillway training wall, vegetation on the downstream slope and recent riprap placement over the berm/parking area fill



Deterioration of right embankment toe
Note scarp in recent riprap overlay and cloudy flow



Overtopping before deterioration at the crest



Overtopping and progression of tunnel roof collapse through the crest as viewed from left abutment
Note alignment of guardrail and distortion in downstream shoulder chainlink fence and water receding from bridge deck



Overtopping and progression of tunnel roof collapse

Note the alignment of the upstream guardrail

The double section of guardrail is 16 ft long, with post spaced about 3 feet apart
Single guardrail sections are 20 long with posts spaced about 5 ft apart



Progression of breach through the right embankment as viewed from right abutment
Note about 10-15 feet of pavement is still adjacent to the spillway training wall at the crest



Progression of breach as viewed from left abutment



Complete breach as viewed from left abutment
(McCarthy)



Breach Area



View from right abutment during last seconds before complete breach
Note what appear to be two collapsed tunnel roofs
(Sniped from CBS News Video)

For reference, the double section of guardrail is 16 ft long, with post spaced about
3 feet apart

Single guardrail sections are 20 long with posts spaced about 5 ft apart



View from right abutment as completed breach was forming
Note active deterioration
(Sniped from CBS News Video)



View from right abutment of embankment as complete breach was forming
(Sniped from CBS News Video)



Upstream view just prior to complete breach
(Sniped from local resident video)



Upstream view just after complete breach
(Sniped from local resident video)



Breach viewed from left (north) abutment



Continuing embankment breach flow erosion
Note advanced erosion in original embankment along guard rail and concrete core
wall compared to the 1960s berm/parking area
(McCarthy)



Post breach conditions
(Courtesy Iowa DNR)
Elevations NAVD88

Road at edge of right embankment remnant- 905.17 FT.
Top of Concrete core wall 898.7 FT
Center of Spillway deck road 904.7 FT