NATIONAL DAM INSPECTION PROGRAM
CORPS OF ENGINEERS

WHETSTONE BROOK DAM
CT-00167

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Whetstone Brook Dam

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is approx. 18 ft. high and 250 ft. long. The spillway which comprises the dam section is a stone masonry gravity section with a 5 ft. high dike to the left and concrete intake structure to the right. The project is in poor condition. There is substantial seepage, the sluice gates are inoperable, there is a gap in the left intake channel of 0.4 ft.

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INSPECTION REPORT

WHETSTONE BROOK DAM - CT 00167

The dam is approximately 18 feet high and 250 feet long. The spillway which comprises the main dam section is a stone masonry gravity section with a 5 foot high dike to the left and concrete intake structure to the right.

The 100 foot long spillway is constructed of uncut to extremely rough cut, dry-laid stone masonry with a 6 foot wide concrete cap. The masonry is at a batter of 5 vertical to 1 horizontal on the downstream side and the spillway approach channel slopes sharply and has a silt, sand and gravel bottom.

For the Owner's information and use, the following items are attached:

1. "Visual Inspection Check List".
2. Hydraulic/Hydrologic computations.
3. Existing data and correspondence.
4. Photos of project.

Based upon the visual inspection, the project is in poor condition. The following features could influence the future condition and/or stability of the project.

1. There is substantial seepage emanating from the downstream face of the masonry spillway section.
2. The sluice gates in the intake structure at the right end of the dam area inoperable.
3. The left intake channel wingwall has become separated from the gate structure, leaving a gap of 0.4 feet between them.

The owner should retain the services of a registered professional engineer to perform further studies pertaining to the following general recommendations. More specific recommendations, made by the engineer, should be implemented by the owner.

1. The seepage through the dam should be investigated. Measures should be undertaken to eliminate the seepage, or a seepage monitoring program should be established.

2. The outlet works should be made operable, in order to partially draw down the pond level, should the need occur.

3. The left intake channel wingwall should be securely fixed in its original position, attached to the gate structure.

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Whetstone Brook Dam DATE: June 5, 1980

TIME: 3:00 pm

WEATHER: Sunny 75°

W.S. ELEV. 99.0± U.S. 82.0± DN.S

PARTY:	INITIALS:	DISCIPLINE:
1. Peter Heynen	PH	Geotechnical
2. Ted Stevens	TS	Geotechnical
3. Hector Moreno	HM	Hydraulics
4. Robert Jahn	RJ	Hydraulics
5. Tim Kavanaugh	TK	Survey
6. Moshé Norman	MN	Survey

PROJECT FEATURE	INSPECTED BY	REMARKS
1. Masonry Spillway	PH, TS, HM, RJ	Poor cond.
2. Concrete Intake Structure	PH, TS, HM, RJ	Poor cond.
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		

PERIODIC INSPECTION CHECK LIST

PROJECT Whetstone Brook Dam DATE 6-5

PROJECT FEATURE Masonry Spillway BY PHJS

AREA EVALUATED		CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS		
a) Approach Channel		
General Condition		Good, drops off quickly
Loose Rock Overhanging Channel		No
Trees Overhanging Channel		No
Floor of Approach Channel		Silt, Sand, Cobbles
b) Weir and Training Walls		
General Condition of Concrete		Poor - just a thin, shell-like cap over masonry
Rust or Staining		None observed
Spalling		
Any Visible Reinforcing		N/A
Any Seepage of Efflorescence		No - seepage of water thru masonry
Drain Holes		N/A
c) Discharge Channel		
General Condition		Good
Loose Rock Overhanging Channel		No
Trees Overhanging Channel		No
Floor of Channel		Cobbles
Other Obstructions		No obstructions - channel in deep, wide valley.

PERIODIC INSPECTION CHECK LIST

PROJECT Whetstone Brook Dam DATE 6-5-80

PROJECT FEATURE Concrete Intake Structure BY PH, TS, HM, RJ

AREA EVALUATED		CONDITION
OUTLET WORKS-INTAKE CHANNEL AND INTAKE STRUCTURE		
a) Approach Channel		
Slope Conditions		Submerged-could not observe
Bottom Conditions		Silty
Rock Slides or Falls		No
Log Boom		No
Debris		Minor floating debris
Condition of Concrete Lining		Poor - left training wall pulled 0.4' away from headwall - exposed reinforcing
Drains or Weep Holes		N/A
b) Intake Structure		
Condition of Concrete		Fair
Stop Logs and Slots		yes - two wood gates, each is 58" wide x 50" deep

5

STATE BOARD FOR THE SUPERVISION OF DAMS
INVENTORY DATA

Long 71-49.8 CT
HALE DAM
LAT 41-50.5

Name of Dam or Pond [illegible]

Code No. [illegible] FY26 [illegible]

Location of Structure Valley Rd. 3200' East of Burlingame Rd

Town [illegible] Lat. 41°-50'-30" N

Name of Stream [illegible] Long. 71°-49'-47" W

U.S.G.S. Quad. E Killingly

Owner [illegible] Company

Address [illegible] Box 190

Putnam, Conn.

Fischer OR 4/73

WA 8-6512

Pond Used For DA 7.44 SM

Dimensions of Pond: Width _____ Length _____ Area ~~3~~ 5

Total Length of Dam 212 Length of Spillway _____

Depth of Water Below Spillway Level (Downstream) ~~[illegible]~~ 16.5

Height of Abutments Above Spillway 6 in

Type of Spillway Construction _____

Type of Dike Construction _____

Downstream Conditions _____

Summary of File Data _____

Remarks _____

13 June 1975

Hale Manufacturing Company
58 Pomfret Street, Box 190
Putnam, Connecticut

Re: Dam on Valley Road (K-4)
Killingly

Gentlemen:

According to the records in this office the above mentioned dam on Whetstone Brook is owned by you.

Section 25-110 (1971 Supplement) of the General Statutes, a copy of which is enclosed, places under the jurisdiction of this department all dams, which by breaking away or otherwise, might endanger life or property. It has been determined that this dam is under the jurisdiction of this department.

In accordance with Section 25-111 (1971 Supplement) of the General Statutes, this dam has been inspected. In order to maintain your dam in a safe condition the following work must be done, or steps taken:

1. The stones at the north end of the spillway must be replaced so as to restore the vertical wall to its original elevation.

2. The remaining flashboards on the spillway should be removed so that the water will flow evenly over the entire spillway during a heavy run-off.

Will you please notify this office within two weeks as to your intentions in regard to this matter.

Very truly yours,

Victor F. Galgowski
Supt. of Dam Maintenance
Water & Related Resources

VFG:ljg

THE HALE MANUFACTURING COMPANY

PROCESSORS OF SYNTHETIC FIBERS

PUTNAM, CONNECTICUT 06260

CABLE CODE: HALEFIBER

AREA CODE 203 WAlnut 8-6512
TWX-710-434-0032

June 19,1973.

Mr. Victor F. Galgowski,
Superintendent of Dam Maintenance,
Water and Related Resources,
State of Connecticut
Department of Environmental Protection
State Office Building
Hartford, Conn. 06115

Dear Mr. Galgowski:

In regard to our two dams, one in East Killingly and one in Ballouville, we will repair them according to your letters dated June 13,1973.

At the East Killingly dam the teenagers in the neighborhood enjoy pushing the rocks off of the top of the dam.

After we get the brush and weeds cleaned out we will replace the rocks with a crane and if it looks feasible, put a cement cap on top so that the rocks cannot be dislodged.

We should have the work at both dams done by June 29, 1973.

When completed I will write to you and tell you what was done.

WATER & RELATED RESOURCES
RECEIVED
JUN 20 1973
ANSWERED
REFERRED
FILED

Very truly yours,

Ernest G. Whalon,
Chief Engineer.

THE HALE MANUFACTURING COMPANY

PROCESSORS OF SYNTHETIC FIBERS

PUTNAM, CONNECTICUT 06260

CABLE CODE: HALEFIBER

AREA CODE 203 WAlnut 8-6512
TWX-710-434-0032

WATER & RELATED RESOURCES
RECEIVED
JUN 27 1973

ANSWERED
REFERRED
FILED

June 26,1973.

Mr. Victor F. Galgowski
Superintendent of Dam Maintenance
Water and Related Resources
State of Connecticut
Department of Environmental Protection
State Office Building
Hartford, Conn. 06115

Dear Mr Galgowski:

In regard to our two dams, one in East Killingly and one in Ballouville, we have repaired them according to your directive.

In East Killingly we dug out all of the weeds and brush, replaced the stones that had been pushed off and put a cement cap across the top of the dam.

In Ballouville we removed all of the brush around the dam and on top of the dike.

Very truly yours,

Ernest G. Whalon

Ernest G. Whalon,
Chief Engineer.

Cahn Engineers Inc. Consulting Engineers

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND Sheet D-1 of 10
Computed By HEU Checked By GAB Date 6/4/80
Field Book Ref. Other Refs. CE #27-785-HA Revisions

HYDROLOGIC / HYDRAULIC INSPECTION

WHETSTONE BROOK (HALE MFG. CO.) DAM, KILLINGLY, CT.

2) PERFORMANCE AT PEAK FLOOD CONDITIONS

1) PROBABLE MAXIMUM FLOOD (PMF)

a) WATERSHED CLASSIFIED AS "ROLLING"

b) WATERSHED AREA:

THE DAM IS LOCATED ON WHETSTONE BROOK D/S FROM A GROUP OF PONDS AND RESERVOIRS WITH ADJACENT SWAMP AND MEADOW AREAS. THE TOTAL WATERSHED IS SUBDIVIDED AS FOLLOWS:

i) D.A. TO EDDY PRAY RESERVOIR DAM: $^*(DA)_{EPR} = 0.87$ sq mi
ii) D.A. TO KILLINGLY POND DAM: $^*(DA)_{KP} = 1.51$ sq mi
iii) D.A. TO ALVIA CHASE RESERVOIR DAM: $^*(DA)_{ACR} = 1.46$ sq mi
iv) TOTAL PONDS/RESERVOIRS DRAINING TO MIDDLE RES. DAM 3.84 sq mi
v) INCREMENT TO MIDDLE RESERVOIR DAM: $\Delta(DA)_M = 0.77$ sq mi
vi) TOTAL D.A. TO MIDDLE RESERVOIR DAM: $^*(DA)_{MR} = 4.61$ sq mi
vii) INCREMENT TO BOG MEADOW RESERVOIR: $\Delta(DA)_{BM} = 0.43$ sq mi
viii) TOTAL D.A. TO BOG MEADOW RESERVOIR DAM: $^*(DA)_{BMR} = 5.04$ sq mi
ix) INCREMENT TO ACME POND: $\Delta(DA)_A = 0.06$ sq mi
x) TOTAL D.A. TO ACME POND DAM: $(DA)_{AP} = 5.10$ sq mi
xi) INCREMENT TO WHETSTONE BROOK DAM: $\Delta(DA)_{WB} = 0.56$ sq mi
xii) TOTAL D.A. TO WHETSTONE BROOK DAM: $(DA)_{WB} = 5.66$ sq mi

*NOTE: DRAINAGE AREAS WITH AN ASTERISK ARE FROM CONN. DEP BULLETIN No. 1 (GAZETTEER OF NATURAL DRAINAGE AREAS) p. 16. ALL OTHER D.A.'S ARE FROM THE U.S.G.S. EAST KILLINGLY, CONN.-RI QUADRANGLE SHEET (REV. 1970) - SCALE 1" = 2000

C) PEAK FLOODS (FROM NED-ACE GUIDELINES - GUIDE CURVES FOR PMF):

THE GROUP OF IMPOUNDMENTS AND THEIR ADJACENT SWAMP/MEADOW LANDS U/S FROM WHETSTONE BROOK DAM COVER (±)15% OF THE WATERSHED AND THEREFORE, THEY HAVE POTENTIALLY, A SIGNIFICANT EFFECT IN THE REDUCTION OF PEAK INFLOWS TO THE DAM.

THIS PEAK FLOOD REDUCTION WAS ESTIMATED BY THE APPROXIMATE ROUTING NED-ACE GUIDELINES ALTERNATE METHOD "SURCHARGE STORAGE ROUTING" AND 19" MAX. PROBABLE R.O. IN NEW ENGLAND.

THE FOLLOWING SIMPLIFYING ASSUMPTIONS ARE MADE, BASED ON FIELD OBSERVATIONS* AND ANALYSIS OF THE WATERSHED:

i) A HORIZONTAL OVERFLOW LENGTH AT THE TOP ELEVATION OF THE DAM WITH DISCHARGE COEFFICIENT $C=3.0$ WAS USED AT ALL ROUTED PONDS/RESERVOIRS. THIS ASSUMES A RELATIVELY SMALL SPILLWAY DISCHARGE (NEGLECTED) WITH RESPECT TO THE TOTAL OUTFLOW.

ii) A FREEBOARD FROM THE NORMAL WATER SURFACE TO THE TOP OF THE DAM (OVERFLOW) OF $H_0 = 4'$ WAS ASSUMED FOR ALL THE ROUTED PONDS/RESERVOIRS

iii) THE ALVIN CHASE RESERVOIR WAS MERGED TO THE MIDDLE RESERVOIR FOR FLOOD ROUTING PURPOSES. SIMILARLY, THE GROUP OF IMPOUNDMENTS COMPRISING BOG MEADOW RESERVOIR AND ACME POND WERE ROUTED AS A SINGLE RESERVOIR WITH THE OVERFLOW SECTION AT ACME POND.

iv) OVERFLOW LENGTHS AND AVERAGE LAKE AREAS WITHIN EXPECTED SURCHARGE DEPTHS, WERE MEASURED ON THE U.S.G.S. EAST KILLINGLY, CONN-RI QUAD. SHEET (REV. 1970), EXCEPT FOR THE ACME POND OVERFLOW LENGTH WHICH IS A FIELD MEASURE.

*CE. FIELD OBSERVATIONS ON 5/1/80 BY HEU & R.J.

Cahn Engineers Inc. Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet D-3 of 10
Computed By HW Checked By GAP Date 6/4/80
Field Book Ref. Other Refs. CE #27-725-H3 Revisions

5) THE FLOOD FROM INCREMENTAL D.A.'S & FROM RESERVOIRS HAS BEEN ASSUMED TO PEAK SIMULTANEOUSLY WITH THE RESERVOIR(S) PEAK OUTFLOW.

A SUMMARY OF THE ROUTING OF PEAK INFLOWS TO WHETSTONE BROOK DAM, FOLLOWS:

NAME / LOCATION OF ROUTED FLOOD	(1) D.A. (SQ. MI)	CSM (CFS/SQ MI)	OVERFLOW LENGTH (FT)	AVE. LAKE AREA (AC)	PMF (CFS)		½ PMF (CFS)	
					PK. INFLOW	PK. OUTFLOW	PK. INFLOW	PK. OUTFLOW
EDDY PRAY	* 0.87	2400	1700	(3) 79.3	2100	1400	1050	350
KILLINGLY	* 1.51	(2) 2100	500	(4) 184	3200	1600	1600	250
ALVIN CHASE AND MIDDLE	△ 2.23	2200	2000	230	7900	6000	3100	1700
BOG MEADOW TO ACME (INCL.)	△ 0.49	2600	750	67	7300	6700	2300	2000
WHETSTONE	△ 0.56	2500	—	—	8100	(5) 8100	2700	(5) 2700

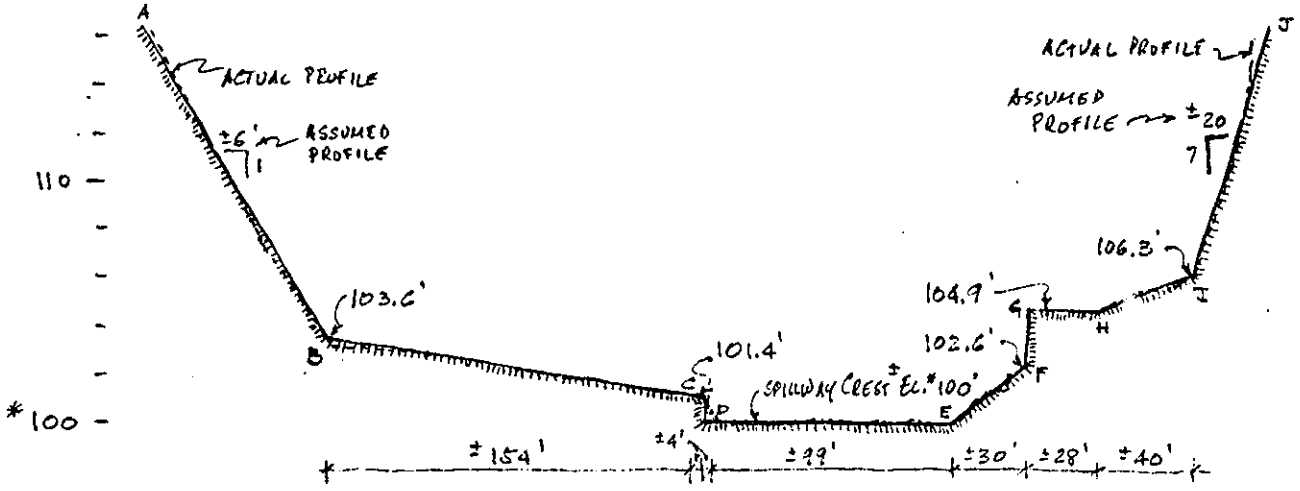
NOTES: 1) DRAINAGE AREA: (*) = TOTAL; (△) INCREMENTAL
2) REDUCED TO ALLOW FOR POSSIBLE OVERFLOW TO MOWRY MEADOW ON OTHER WATERSHED
3) AVERAGE LAKE AREA TO ELEV. 570' NGVD (1' SURCH.) IS $\bar{A} \cong 40.7^{AC}$.
4) AVERAGE LAKE AREA TO TOP OF DAM (±) ELEV. 591' NGVD IS $\bar{A} \cong 147^{AC}$.
5) NO REDUCTION TO THE PEAK INFLOWS ARE EXPECTED AT WHETSTONE BROOK DAM
6) ESTIMATED PEAK INFLOWS TO WHETSTONE BROOK DAM WITHOUT REDUCTION BY U/S PONDS/RESERVOIRS ARE ESTIMATED AT: PMF ≅ 10000 CFS AND ½ PMF ≅ 5000 CFS. i.e., PEAK FLOOD REDUCTION BY U/S RESERVOIRS IS ESTIMATED AT (±) 19% FOR THE "PMF" AND (±) 46% FOR THE "½ PMF"

2) SURCHARGE AT PEAK INFLOWS

a) OUTFLOW RATING CURVE

i) SPILLWAY AND OVERFLOW PROFILE FOR SURCHARGES INVOLVING THE DAM:

SPILLWAY (±) 99' LONG, BROAD-CRESTED (±) 6' BREADTH) WITH ROUGH AND UNEVEN CREST FORMED BY A COARSE CONCRETE CAP DUMPED OVER TO REPAIR THE ORIGINAL STONE MASONRY. THIS COARSE CONCRETE ALSO CAPS THE SLOPING SECTION TO THE RIGHT OF THE DAM (SEE PROFILE SECT. EF.) WHICH IS ALSO ASSUMED AN EXTENSION OF THE SPILLWAY.
THE OVERFLOW SECTION EXTENDS ON MOSTLY CLEAR TERRAIN INCLUDING ROADS (PAVED (RIGHT); DIRT (LEFT)) AT BOTH SIDES OF THE DAM; ASSUME C = 2.8 FOR THE FLOW OVER THE ENTIRE SECTION (SEE PROFILE BELOW).



NOTE: DATA FROM C.E. OBSERVATIONS ON 5/1/80 BY HH & R.T.

WHETSTONE BROOK DAM
APPROXIMATE OVERFLOW PROFILE

*NOTE: NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF WHETSTONE BROOK DAM IS NOT AVAILABLE. THEREFORE, ELEV. 100' ABOVE AN ASSUMED DATUM IS USED AS SPILLWAY ELEVATION. FROM THE CONTOURS ON THE U.S.G.S. EAST KILLINGLY, CONN.-R.I. QUAD. SHEET, THE ASSUMED ELEV. 100' CORRESPONDS TO (±) ELEV. 425' NGVD.

(ii) THEREFORE, ASSUMING EQUIVALENT LENGTHS FOR THE SLOPING TERRAIN, THE OVERFLOW RATING CURVE FOR THE SURCHARGE (H) ABOVE THE SPILLWAY CREST CAN BE APPROXIMATED AS FOLLOWS:

1') SECTION AB: $Q_{AB} = \frac{2}{3} \times 6 \times 2.8 (H-3.6)^{3/2} = \underline{11.2 (H-3.6)^{3/2}}$

2') SECTION BC: $(Q_{BC})_1 = \frac{2}{3} \times \frac{158}{2.2} \times 2.8 (H-1.4)^{3/2} = \underline{134 (H-1.4)^{3/2}}$ $H \leq 3.6'$

$(Q_{BC})_2 = 2.8 \times 158 (H-1.92)^{3/2} = \underline{442 (H-1.92)^{3/2}}$ $H > 3.6'$

3') SPILLWAY (SECTION DE) - (SPILLWAY $L = 99'$; SECT. CD - ASSUMED $L = 4'$)

$Q_S \cong Q_{DE} = 2.8 \times 103 H^{3/2} \cong \underline{288 H^{3/2}}$

4')* SECTION EF: $(Q_{EF})_1 = \frac{2}{3} \times \frac{30}{2.6} \times 2.8 H^{3/2} \cong \underline{21.5 H^{3/2}}$ $H \leq 2.6'$

*(ALSO ASSUMED SPWY.)

$(Q_{EF})_2 = 2.8 \times 30 (H-0.62)^{3/2} = \underline{84 (H-0.62)^{3/2}}$ $H > 2.6$

5') SECTION GH: $Q_{GH} = 2.8 \times 28 (H-4.9)^{3/2} = \underline{78.4 (H-4.9)^{3/2}}$

6') SECTION HI: $(Q_{HI})_1 = \frac{2}{3} \times \frac{40}{1.4} \times 2.8 (H-4.9)^{3/2} = \underline{53.3 (H-4.9)^{3/2}}$ $H \leq 6.3$

$(Q_{HI})_2 = 2.8 \times 40 (H-5.23)^{3/2} = \underline{112 (H-5.23)^{3/2}}$ $H > 6.3$

7') SECTION IJ: $Q_{IJ} = \frac{2}{3} \times \frac{20}{7} \times 2.8 (H-6.3)^{3/2} = \underline{5.33 (H-6.3)^{3/2}}$

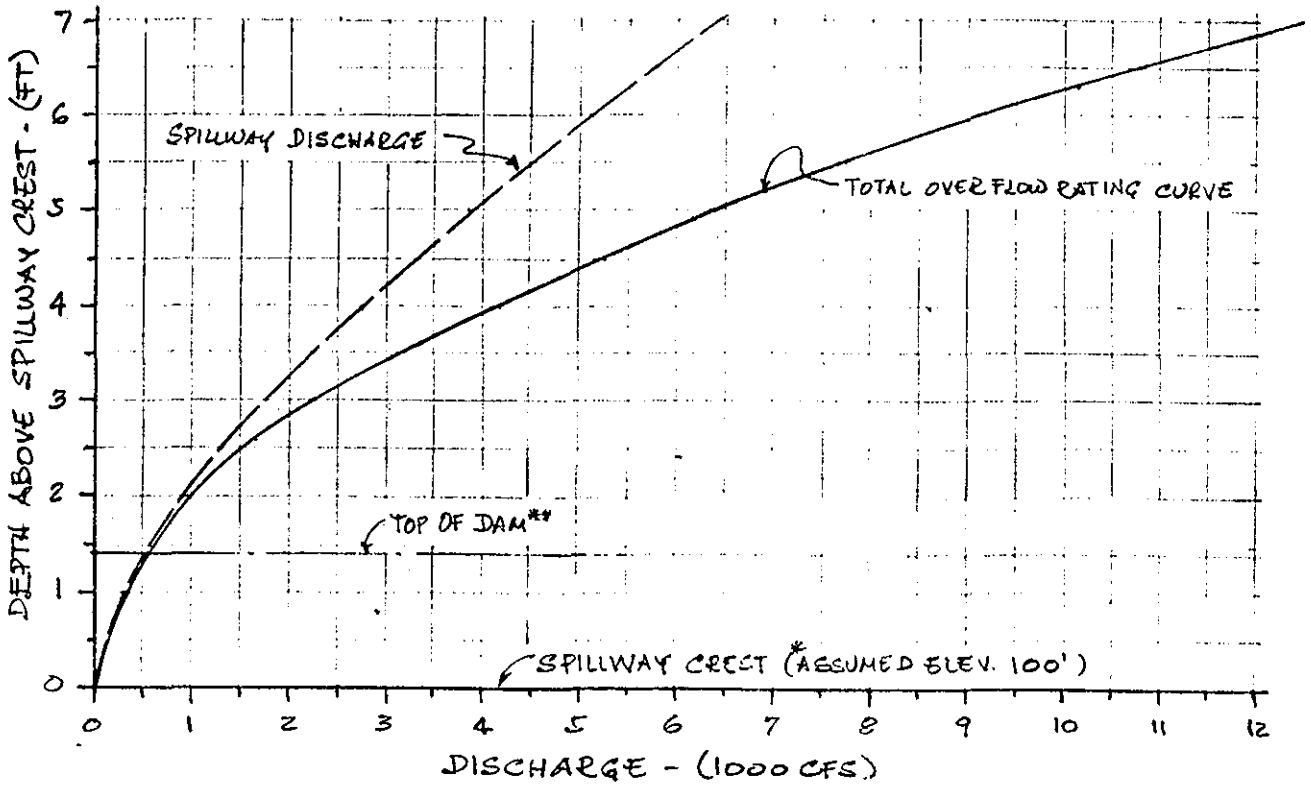
THEREFORE, THE TOTAL OVERFLOW IS APPROXIMATED BY THE SUM OF ALL THE APPLICABLE FORMULAE ON ITEMS (1') TO (7') AND THE CORRESPONDING CURVE IS PLOTTED ON P. D-6.

b) SURCHARGE HEIGHT TO PASS PEAK INFLOW (Q_{P_1} & Q'_{P_1}):

i) @ $Q_{P_1} = 8100^{cfs}$ (PMF) $H_1 \cong \underline{5.6'}$

ii) @ $Q'_{P_1} = 2700^{cfs}$ (½ PMF) $H'_1 \cong \underline{3.3'}$

iii) WETSTONE BROOK DAM - OUTFLOW RATING CURVE



*SEE NOTE p. D-4

**ASSUMED TOP OF DAM AT LOW OVERFLOW POINT TO THE LEFT OF THE SPILLWAY.

c) EFFECT OF SURCHARGE STORAGE - PEAK OUTFLOWS:

i) AVE. LAKE AREA ($\bar{A}$) WITHIN EXPECTED SURCHARGE:

1') LAKE AREA AT FLOW LINE (ASSUMED @(≈) EL. 425' NGVD (p. D-4))®: $\bar{A} \approx 2.2^{AC}$.
2') AREA AT CONTOUR 430' NGVD (MSL)®: $A_{430} \approx 6.4^{AC}$

∴ AVE. AREA WITHIN EXPECTED SURCHARGE (5.6'): $\bar{A} \approx \underline{4.6}^{AC}$ (GRAPHICAL INTERP.

®NOTE: AREAS FROM USGS, EAST KILLINGLY, CONN-RI QUAD. SHEET - SCALE 1" = 2000'

ii) ASSUME NORMAL POOL AT FLOW LINE (ELEV. 100' DAM...

iii) WATERSHED D.A. ≅ 5.66 sq mi (REGULATED BY 4/5 RESERVOIRS - SEE p. D-1)

iv) PEAK OUTFLOWS (Q_{P_3} & Q'_{P_3})

BECAUSE THE LAKE AREA AND CONSEQUENTLY, THE SURCHARGE STORAGE OF WHETSTONE BROOK DAM POND ARE TOO SMALL TO HAVE AN APPRECIABLE EFFECT IN THE REDUCTION OF THE PEAK FLOWS, THE PEAK OUTFLOWS ARE APPROXIMATELY,

$Q_{P_3} \cong Q_{P_1} \cong 8100^{CFS}$ $H_3 \cong \underline{5.6'}$

$Q'_{P_3} \cong Q'_{P_1} \cong 2700^{CFS}$ $H'_3 \cong \underline{3.3'}$

(SEE RATING CURVE p. D-6)

3) SPILLWAY CAPACITY RATIO TO PEAK OUTFLOWS

SPILLWAY CAPACITY TO:	SURCH* H (FT)	W.S. ELEV. (FT-DATUM)**	SPILLWAY CAPACITY (CFS)	SPILLWAY CAPACITY AS % OF PEAK OUTFLOWS	
				Q_{P_3} (8100 CFS)	Q'_{P_3} (2700 CFS)
TOP OF DAM***	1.4	101.4	510	6.3	19
1/2 PMF	3.3	103.3	2000	—	74
PMF	5.6	105.6	4600	57	—

*SURCHARGE ABOVE THE SPILLWAY CREST
**SEE NOTE p. D-4
***ASSUMED AT THE LOW OVERFLOW POINT TO THE LEFT OF THE SPILLWAY.

WHETSTONE BROOK DAM

II) DOWNSTREAM FAILURE HAZARD

1) POTENTIAL IMPACT AREA.

AN INDUSTRIAL BUILDING AND AT LEAST 7 HOUSES WITH FIRST FLOOR ELEVATIONS BETWEEN (±)3.5' AND 6' ABOVE THE STREAM ARE LOCATED W/S WITHIN A DISTANCE OF (±)4000' FROM WHETSTONE BROOK DAM. SOME SMALL PONDS AND A MILL ALSO ARE LOCATED IN THIS WHETSTONE BROOK REACH, WHICH IS CONSIDERED TO BE THE POTENTIAL IMPACT AREA IN CASE OF FAILURE OF THE DAM.

2) FAILURE AT WHETSTONE BROOK DAM

ASSUME SURCHARGE TO TOP OF DAM ELEV. 101.4' DATUM (± EL. 425' NGVD - P.D.

a) HEIGHT OF DAM*: $H \cong 17.6'$ (TOE ELEV. (±) 83.8' DATUM $\cong$ (±) EL. 341' NGVD)

b) MID-HEIGHT LENGTH*: $\ell \cong 113'$

c) BREACH WIDTH (SEE NED-ACE W/S DAM FAILURE GUIDELINES)

$$W = 0.4 \times 113 = 45.2' \quad \therefore \quad \text{ASSUME } W_b = 45'$$

d) ASSUMED WATER DEPTH AT TIME OF FAILURE: $y_o = 17.6'$

e) SPILLWAY DISCHARGE AT TIME OF FAILURE:

i) PREVIOUS TO FAILURE: $Q_S = 510^{CFS}$ (SEE P. D-7)
ii) AFTER FAILURE (ASSUM. REMAINING SPWY. - $L \cong 84'$); $Q_S' \cong 390^{CFS}$

*FROM CE FIELD MEASUREMENTS ON 5/1/80 BY HH & R.J.

f) BREACH OUTFLOW (SEE NED-ACE GUIDELINES)

$$Q_b = \frac{8}{27} W_b \sqrt{g}\, Y_0^{3/2} = 5600^{CFS}$$

g) PEAK FAILURE OUTFLOW (Q_{P_1}) TO WHETSTONE BROOK:

$$Q_{P_1} = Q_s' + Q_b \approx \underline{\underline{6000}}^{CFS}$$

3) FLOOD DEPTH* IMMEDIATELY D/S FROM DAM:

$$Y \approx 0.44\, Y_0 = \underline{\underline{7.7'}}$$

*(FROM RETREATING WAVE THEORY APPLIED TO DAM FAILURE)

4) ESTIMATE OF D/S FAILURE CONDITIONS AT POTENTIAL IMPACT AREA:

(SEE NED-ACE GUIDELINES FOR ESTIMATING D/S FAILURE HYDROGRAPHS)

a) THE (±) 4000' LONG REACH OF WHETSTONE BROOK D/S FROM THE DAM WHICH CONSTITUTES THE POTENTIAL IMPACT AREA IS GENERALLY TRAPEZOIDAL IN CROSS SECTION WITH (±) 200' BASE AND (±) 3" AND 15" TO 1" SIDE SLOPES. THE AVERAGE REACH SLOPE IS (±) 1.6%. ASSUME $n = 0.050$.

b) RESERVOIR STORAGE AT TIME OF FAILURE:

$$^{*}S_{MAX} \approx \underline{25}^{AC\text{-}FT} \qquad S/2 = 12.5^{AC\text{-}FT}$$

*C.E. ESTIMATE BASED PRIMARILY ON LAKE AREA AT FLOW LINE AND AT CONTOUR 430' NGVD (SEE P. D-6): $A_{WL} = 2.2^{AC}$; $A_{430} = 6.4^{AC}$; HEIGHT OF DAM (P. D-8) $H = 17.6'$ ($H_{WL} = 16.2'$) AND LAKE LENGTH (±) 650' AND WIDTH (±) 200', AT FLOW LINE. IT IS NOTED THAT BASED ON THESE DATA, THE MAX. STORAGE VALUE OF 54 AC-FT GIVEN ON THE ACE US INVENTORY OF DAMS OF 1/23/80, P. 23, IS CONSIDERED TOO LARGE.

Cahn Engineers Inc. **Consulting Engineers**

Project NON-FEDERAL DAMS INSPECTION Sheet D-10 of 10
Computed By [illegible] Checked By G.A.B. Date 6/11/80
Field Book Ref. Other Refs. CE # 27-785-[illegible] Revisions

c) APPROXIMATE STAGE D/S FROM DAM AFTER FAILURE:

THE REACH IS SUBDIVIDED TO HAVE $V \leq S/2$ (SEE NED-ACE GUIDELINES)

REACH L (FT)	Q_{P_1} (CFS)	Y_1 (FT)	V_1 (AC-FT)	Q_{P_2} (CFS)	Y_2 (FT)	V_2 (AC-FT)	$\bar{V}$ (AC-FT)	Q_{P_3} (CFS)	Y_3 (FT)
700	6000	3.4	12.4	3020	2.2	7.9	10.2	3560	2.5
950	3560	2.5	12.0	1850	1.7	7.9	10.0	2140	1.8
1350	2140	1.8	12.4	1080	1.2	8.0	10.2	1270	1.4
1000	1270	1.4	6.6	940	1.1	5.4	6.0	970	1.2

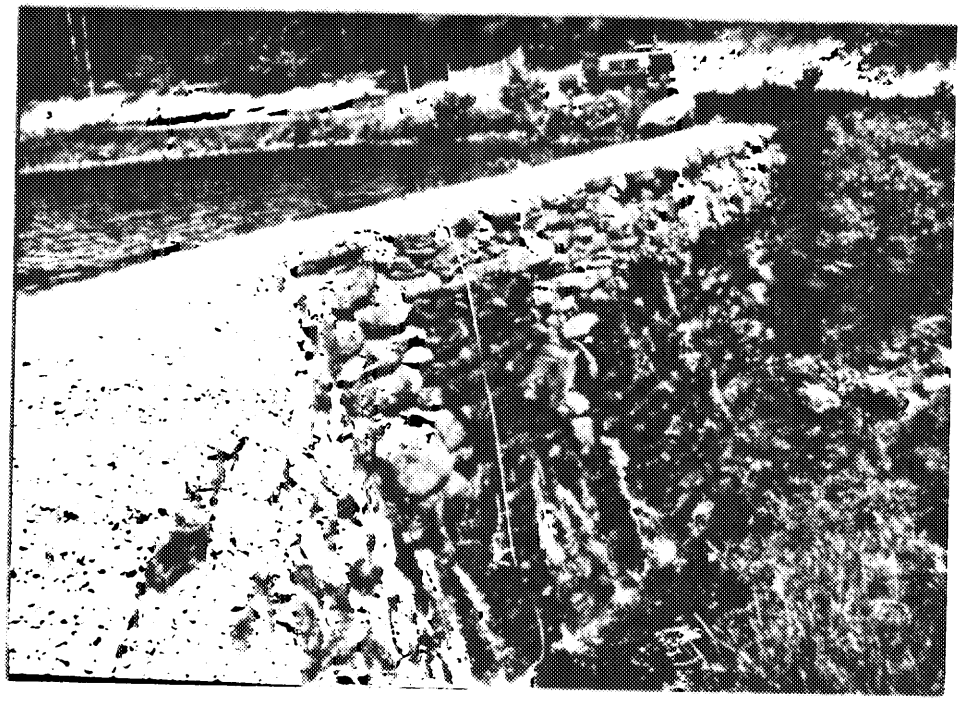
∴ THE PEAK FLOOD THROUGH THE POTENTIAL IMPACT AREA UPON FAILURE OF WHETSTONE BROOK VARIES APPROXIMATELY FROM $Q_{P_1} \cong 6000^{CFS}$ JUST D/S FROM THE DAM TO (±) $Q_{P_3} \cong \underline{970}^{CFS}$, APPROX. 4000' D/S.

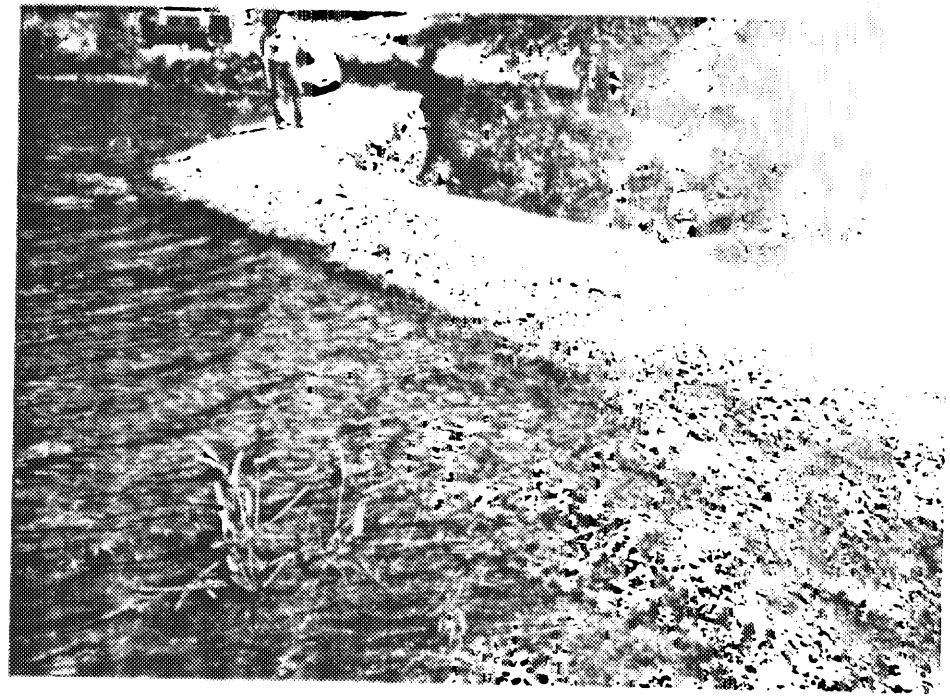
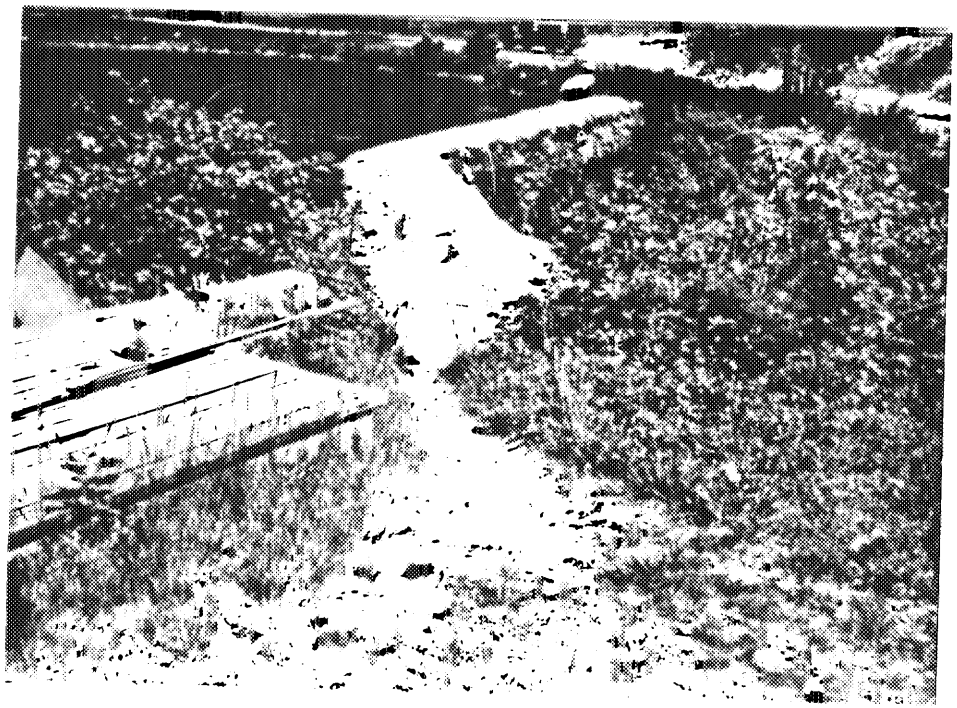
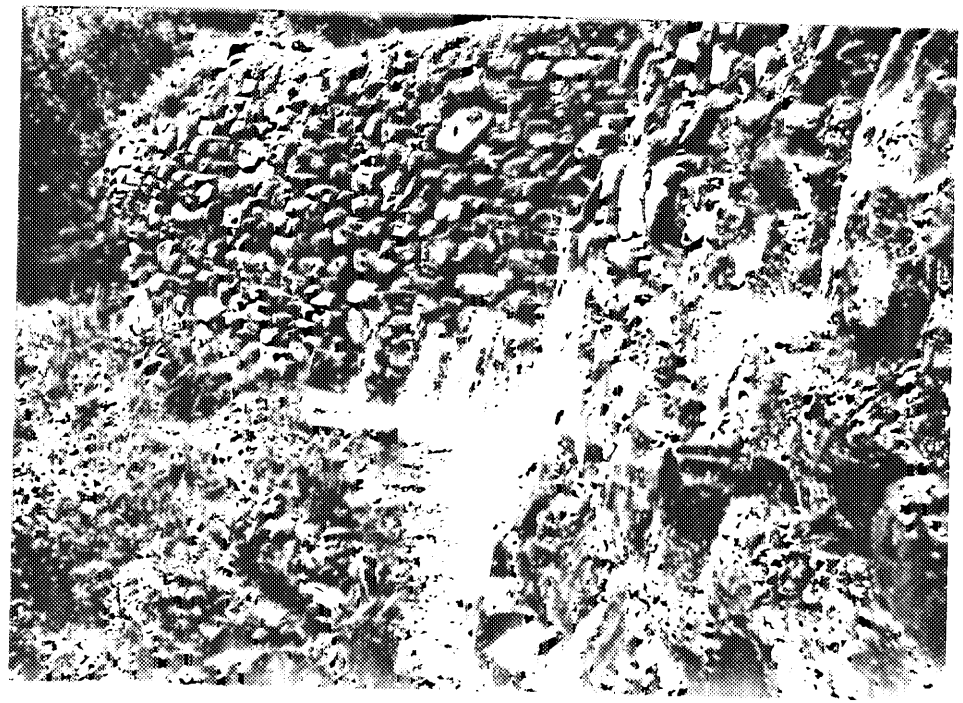
THE CORRESPONDING CHANNEL STAGE VARIES APPROXIMATELY FROM $Y_0 \cong 7.7'$ IMMEDIATELY D/S FROM THE DAM AND FROM (±) $Y_1 \cong \underline{3.4'}$ TO (±) $Y_3 \cong \underline{1.2'}$ THROUGH THE POTENTIAL IMPACT AREA.

d) APPROXIMATE STAGE BEFORE FAILURE: $Q_s = 510^{CFS}$ $Y_s \cong \underline{0.8'}$

e) RAISE IN STAGE THROUGH THE IMPACT AREA VARIES APPROXIMATELY FROM

$\Delta Y_1 \cong \underline{2.6'}$ TO $\Delta Y_3 \cong \underline{0.4'}$





CT-167 WHETSTONE BROOK DAM