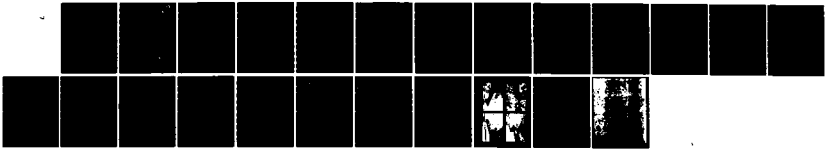


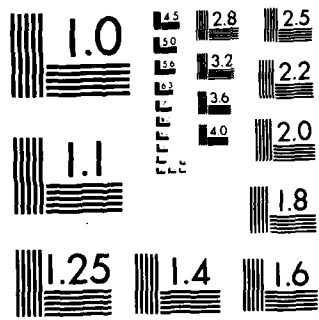
62-143 495

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
WHEATSTONE BROOK DAM (CT 00167) PHASE I INSPECTION
REPORT(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV
JUN 80 F/8 13/13 ML

272

UNCLASSIFIED





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NATIONAL DAM INSPECTION PROGRAM
CORPS OF ENGINEERS



AD-A143 455

WHETSTONE BROOK DAM
CT-00167

~~Copy~~ available to DTIC does not
permit fully legible reproduction.

DTIC FILE COPY

DTIC
ELECTE
S JUL 25 1984 D
D

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

84 07 24 112

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00167	2. GOVT ACCESSION NO. AD-A143455	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Whetstone Brook Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE June 1980
		13. NUMBER OF PAGES 20
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES 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.		

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.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist.	Avail and/or Special
A/1	77



VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

A-1

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

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

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

A-1

PERIODIC INSPECTION CHECK LIST

Page 1-2

PROJECT Whetstone Brook Dam

DATE 6-5-83

PROJECT FEATURE Masonry Spillway

BY PH, TS, HM, RJ

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

PERIODIC INSPECTION CHECK LIST

Page A-3

PROJECT Whetstone Brook Dam

DATE 6-5-80

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

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

STATE BOARD FOR THE SUPPL.
INVENTORY OF

HALE DAM

5
CT

Name of Dam or Pond HALE DAM

Code No. 1126

Location of Structure Valley Rd. 3200' East of Darling Ave Rd

Town 1-11

Lat. 41°-50'-30" N

Name of Stream Whitstone Cr.

Long 71°-49'-47" W

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

Owner Boy's Manufacturing Company

Fish CR

Address 17 Park St. P.M. 190

4/77

Pittsfield, Conn.

WA 8-6512

Pond Used For DA 7445M

Dimensions of Pond: Width 212 Length 1 Area 5

Total Length of Dam 212 Length of Spillway 1

Depth of Water Below Spillway Level (Downstream) 16.5

Height of Abutments Above Spillway 6 in

Type of Spillway Construction 1

Type of Dike Construction 1

Downstream Conditions 1

Summary of File Data 1

Remarks 1

13 June 1973

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

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

HYDROLOGIC / HYDRAULIC INSPECTION

WHESTONE 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 WHESTONE BROOK $\frac{1}{2}$ MILE 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: | $*(DA)_{EP} = 0.87$ ^{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 RESERVOIR DAM: | <u>3.84</u> ^{sq mi} |
| v) INCREMENT TO MIDDLE RESERVOIR DAM: $\Delta(DA)_{MR} = 0.77$ ^{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: | $*(DA)_{BM} = 5.04$ ^{sq mi} |
| ix) INCREMENT TO ACHE POND: $\Delta(DA)_A = 0.06$ ^{sq mi} | |
| x) TOTAL D.A. TO ACHE POND DAM: | $(DA)_{AP} = 5.10$ ^{sq mi} |
| xi) INCREMENT TO WHESTONE BROOK DAM: $\Delta(DA)_{WB} = 0.56$ ^{sq mi} | |
| xii) TOTAL D.A. TO WHESTONE BROOK DAM: | $(DA)_{WB} = 5.66$ ^{sq mi} |

Copy available to DTIC does not
 permit fully legible reproduction

*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) 25051-200.

NON-FEDERAL DAMS INSPECTION

Sheet 4-2 of 9

Computed By HU

Checked By CAIR

Date 6/8/80

Field Book Ref _____

Other Refs. CE # 27-785-11A

Revisions _____

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

THE GROUP OF IMPOUNDMENTS AND THEIR ADJACENT SWAMP/MEADOW LANDS 4/5 FROM WHETSTONE BEDDOK DAM COVER (*) 15% OF THE WATERSHED AND THEREFORE, THEY HAVE POTENTIALLY, A SIGNIFICANT EFFECT IN THE REDUCTION OF PEAK INFLOW 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 WERE MADE, BASED ON FIELD OBSERVATIONS* AND ANALYSIS OF THE INTERFERED.

i) A HORIZONTAL OVERFLOW LENGTH AT THE TOP ELEVATION OF THE DAM WITH DISCHARGE COEFFICIENT $C = 3.0$ WERE 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 ALVIA CHISEE 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 WJL & WJT

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet D-3 of 10
 Computed By HU Checked By GR Date 6/4/80
 Field Book Ref. _____ Other Refs. CE # 27-705-113 Revisions _____

5) THE FLOOD FROM INCREMENTAL D.A.'S ^(A) FROM RESERVOIRS HAS BEEN ADJ-
 USTED 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	D. A. (SQ. MI)	CSM (CFS/SQMI)	OVERFLOW LENGTH (FT)	AVE LAKE AREA (AC)	PMF (CFS)		1/2 PMF (CFS)	
					PK. INFLOW	PK. OUTFLOW	PK. INFLOW	PK. OUTFLOW
EDDY PRAY	* 0.87	2400	1700	^(B) 77.3	2100	1400	1050	350
KILLINGLY	* 1.51	^(B) 2100	500	^(A) 184	3200	1600	1500	250
ALVIA CHASE AND MIDDLE	^(A) 2.23	2200	2000	230	7900	6000	3100	1700
BOG MEADOW TO ACME (INCL.)	^(A) 0.49	2600	750	67	7300	6700	2300	2000
WHETSTONE	^(A) 0.56	2500	—	—	8100	^(S) 8100	2700	^(S) 2700

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

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet D-4 of 10
 Computed By YLL Checks By GAB Date 6/6/80
 Field Book Ref. _____ Other Refs. CE #27-785-7A Revisions _____

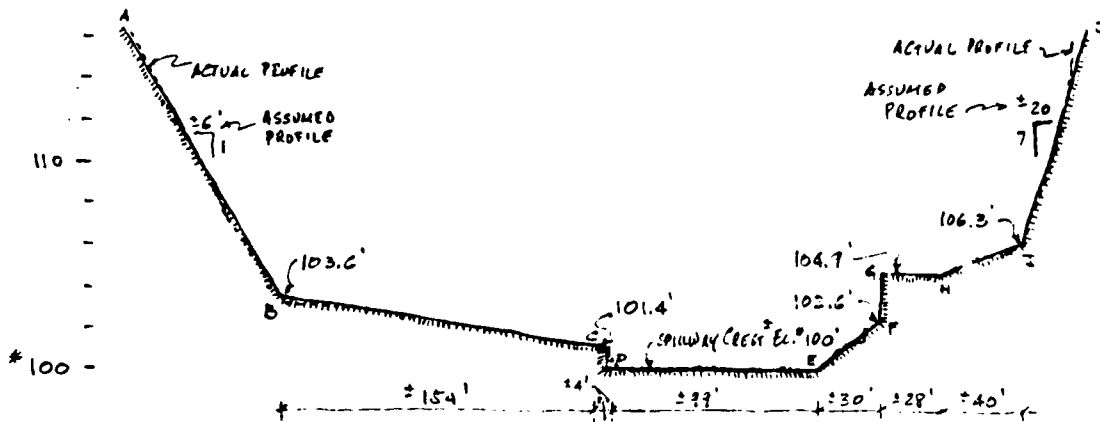
2) SURCHARGE AT PEAK INFLOWS

a) OUTFLOW RATING CURVE

i) SPILLWAY AND OVERFLOW PROFILE FOR SURCHARGE FLOW AT PEAK INFLOWS

SPILLWAY (2) 99' LONG, BROAD-CRESTED (2) 6' BROADTH) 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 - PCT. CF) WHICH IS ALSO ASSUMED AN EXTENSION OF THE SPILLWAY.

THE OVERFLOW SECTION EXTENDS ON HOSTLY 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 YLL & R.T.

WHETSTONE BROOK DAM
APPROXIMATE OVERFLOW PROFILE

*NOTE: NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF 11' FT. ABOVE BASSON DAM IS NOT AVAILABLE. THEREFORE, ELEV. 100' ABOVE AN ASSUMED DATUM IS USED AS SPILLWAY ELEVATION. FROM THE CONTOURS ON THE UNITED STATES GEOLOGICAL SURVEY, CONN. - RI. COR. SURVEY, THE ASSUMED ELEV. 100' CORRESPONDS TO (±) ELEV. 425' NGVD.

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet D-5 of 10
 Computed By WJ Checked By CFB Date 6/9/80
 Field Book Ref. _____ Other Refs. CE # 27-735-11A Revisions _____

(i) 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:

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

$$2') \text{ SECTION BC: } (Q_{BC})_1 = \frac{2}{3} \times 158 \times 2.8 (H-1.4)^{3/2} = \underline{154 (H-1.4)^{3/2}} \quad H \leq 3.5$$

$$(Q_{BC})_2 = 2.8 \times 158 (H-1.92)^{3/2} = \underline{442 (H-1.92)^{3/2}} \quad H > 3.5$$

3') SPILLWAY (SECTION DE) - (SPILLWAY L=99'; SECT CD ASSUMED 100')

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

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

* (ALSO ASSUMED SPILLWAY)

$$(Q_{EF})_2 = 2.8 \times 30 (H-0.62)^{3/2} = \underline{24 (H-0.62)^{3/2}} \quad H > 2.6$$

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

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

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

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

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

b) SURCHARGE HEIGHT TO PASS PEAK FLOOD ($Q_p = 21,000$)

i) @ $Q_p = 8100$ cfs (PMF) $H_1 = \underline{5.6'}$

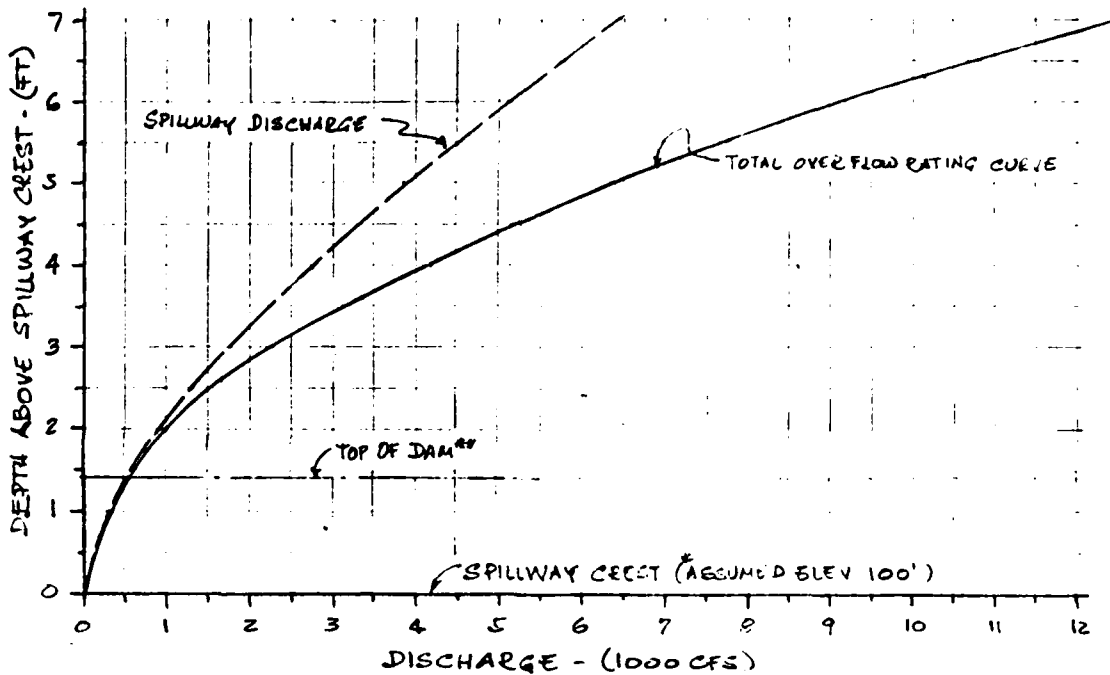
ii) @ $Q_p = 2700$ cfs ($1/2$ PMF) $H_1 = \underline{3.3'}$

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet 7-6 of 15
 Computed By WJL Checked By G.P.B. Date 5/1/75
 Field Book Ref. _____ Other Refs CE# 27-715-11A Revisions _____

(ii) 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:

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

1) LAKE AREA AT FLOODLINE (ASSUMED @ (E) EL 455' NGVD (P.D.-4)): $\bar{A} = 2.2^{ac}$

2) AREA AT CONTOUR 430' NGVD (MS): $A_{430} = 6.4^{ac}$

\therefore AVE AREA WITHIN EXPECTED SURCHARGE (20'): $\bar{A} = 4.6^{ac}$ (ARITHMETIC AVERAGE)

NOTE: AREAS FROM U.S.G.S. EAST KILLBUCK, "DUNKIRK" 2500 SHEET - DATE 1/2000'

(ii) ASSUME NORMAL POOL AT FLOODLINE (ELEV 100' DRAWN)

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet D-7 of 10
 Computed By WJH Checked By GAB Date 6.10.80
 Field Book Ref. _____ Other Refs. CE # 27-305-HA Revisions _____

(ii) WATERSHED D.A. = 5.66 ^{sq mi} (REGULATED BY 4% RESERVOIRS - SEE P. D-1)

(iv) PEAK OUTFLOWS (Q_{P3} & Q'_{P3})

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,

$$Q_{P3} \approx Q_{P1} \approx 8100 \text{ cfs} \quad H_3 \approx \underline{5.6'}$$

$$Q'_{P3} \approx Q'_{P1} \approx 2700 \text{ cfs} \quad H'_3 \approx \underline{3.3'}$$

(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_{P3} (8100 CFS)	Q'_{P3} (2700 CFS)
TOP OF DAM***	1.4	101.4	510	6.3	19
1/2 PAF	3.3	103.3	2900	—	7.9
PAF	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

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAM INSPECTION Sheet D-8 of 10
Computed By HU Checked By GAB Date 6/10/80
Field Book Ref. _____ Other Refs. CE # 27-785-BA Revisions _____

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) 3.5' AND 6' ABOVE THE STREAM ARE LOCATED $\frac{1}{2}$ WITHIN A DISTANCE OF (2) 400' 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 - 10')

a) HEIGHT OF DAM*: $H = 17.6'$ (TOE ELEV. (1) 83.8' DATUM \approx (2) EL. 341' NGVD)

b) MID-HEIGHT LENGTH*: $L = 113'$

c) BREACH WIDTH (SEE NED-ACE ²: DAM FAILURE GUIDELINES):

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

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

e) SPILLWAY DISCHARGE AT TIME OF FAILURE:

(i) PREVIOUS TO FAILURE: $Q_s = 510 \text{ cfs}$ (SEE P. D-7)

(ii) AFTER FAILURE (ASSUM REMAINING SPILL. $L = 84'$): $Q_s' = 390 \text{ cfs}$

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

Cahn Engineers Inc.

Consulting Engineers

Project NON-FEDERAL DAMS INSPECTION Sheet D-9 of 10
Computed By WLL Checked By GDJ Date 6/10/80
Field Book Ref. _____ Other Refs. CE # 27-725-1.1 Revisions _____

f) BREACH OUTFLOW (SEE NED-1 *E GUIDELINES)

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

g) PEAK FAILURE OUTFLOW (Q_p) TO WHETSTONE BROOK.

$$Q_p = Q_s + Q_b = \underline{6000} \text{ cfs}$$

3) FLOOD DEPTH * IMMEDIATELY $\frac{1}{2}$ FROM DAM:

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

*(FROM RETREATING WAVE THEORY APPLIED TO DAM FAILURE)

4) ESTIMATE OF $\frac{1}{2}$ FAILURE CONDITIONS AT POTENTIAL IMPACT AREA:

(SEE NED-ACE GUIDELINES FOR ESTIMATING $\frac{1}{2}$ FAILURE HYDROLOGICALS)

a) THE (*) 4000' LONG REACH OF WHETSTONE BROOK $\frac{1}{2}$ FROM THE DAM WHICH CONSTITUTES THE POTENTIAL IMPACT AREA IS GENERALLY TRIANGULAR IN CROSS SECTION WITH (1) 200' BASE AND (2) 3" AND 15" TO 1" SIDE SLOPES. THE AVERAGE REACH SLOPE IS (2) 1.6%. ASSUME $n = 0.050$.

b) RESERVOIR STORAGE AT TIME OF FAILURE:

$$* S_{MAX} \approx \underline{25} \text{ AC-FT}$$

$$S/2 = 12.5 \text{ AC-FT}$$

* C.E. ESTIMATE BASED PRIMARILY ON LAKE AREA AT FLOW LINE AND AT CONTOUR 430' NED (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 (1) 650' AND WIDTH (1) 200', AT FLOW LINE. IT IS NOTED THAT BASED ON THESE DATA, THE MAX. STORAGE VALUE OF 25 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-FEDERAC DAMS INSPECTION Sheet D-10 of 10
 Computed By HLL Checked By G.A.P. Date 5/11/82
 Field Book Ref. _____ Other Refs. CE # 27-725-11 Revisions _____

c) APPROXIMATE STAGE $\frac{1}{2}$ FROM DAM AFTER FAILURE

THE REACH IS SUBDIVIDED TO HAVE $V \approx \frac{1}{2}$ (SEE MED-AGE GUIDELINES)

REACH L (FT)	Q_p (CFS)	Y_1 (FT)	V_1 (AC FT)	Q_{p2} (CFS)	Y_2 (FT)	V_2 (AC FT)	\bar{V} (AC FT)	Q_{p3} (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

\therefore THE PEAK FLOOD THROUGH THE POTENTIAL IMPACT AREA UPON FAILURE OF WHEATSTONE BRIDGE VARIES APPROXIMATELY FROM $Q_p \approx 6000$ CFS JUST $\frac{1}{2}$ FROM THE DAM TO (2) $Q_{p3} \approx 970$ CFS; APPROX. 4000' $\frac{1}{2}$.

THE CORRESPONDING CHANNEL STAGE VARIES APPROXIMATELY FROM $Y_0 \approx 7.7'$ IMMEDIATELY $\frac{1}{2}$ FROM THE DAM AND FROM (1) $Y_1 \approx 3.4'$ TO (2) $Y_3 \approx 1.2'$ THROUGH THE POTENTIAL IMPACT AREA.

d) APPROXIMATE STAGE BEFORE FAILURE $Q_p = 510$ CFS $Y_0 \approx 0.8'$

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

$AY_0 \approx 2.6'$ TO $AY_3 \approx 0.4'$



CT-167 WHETSTONE BROOK DAM



STATE BOARD FOR THE SUPPL.
INVENTORY IN

5

CT

HALE DAM

Name of Dam or Pond HALE DAM

Code No. 176

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

Town 1-11 Lat. 41°-50'-30" N

Name of Stream Whetstone Cr. Long 71°-49'-47" W

U.S.G.S. Quad. E. Killbuck

Owner Hale Manufacturing Company

Address 175 Portland St. Portland

Portland, Ore. WA 8-6512

Fish
CR
4/77

Pond Used For DA 7.445M

Dimensions of Pond: Width 212 Length 1 Area 5

Total Length of Dam 212 Length of Spillway 1

Depth of Water Below Spillway Level (Downstream) 16.5

Height of Abutments Above Spillway 6 in

Type of Spillway Construction 1

Type of Dike Construction 1

Downstream Conditions 1

Summary of File Data 1

Remarks 1

END

FILMED

9m84

1111