APPENDIX A

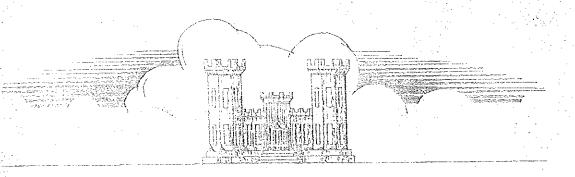
EXCERPTS FROM 1979 DAM INSPECTION REPORT (WOODWARD CLYDE CONSULTANTS)

DELAWARE RIVER BASIN SCHUYLKILL RIVER, BERKS COUNTY

PENNSYLVANIA NDS 10 PA. 00723 DER 10 8-434

ARM MERNSULLE DAM

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY Baltimore District, Corps of Engineers Baltimore, (Maryland 21203

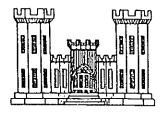
JULY 1970

DELAWARE RIVER BASIN

NEW KERNSVILLE DAM, BERKS COUNTY, PENNSYLVANIA

NDS I.D. NO. PA 00723 DER:I.D. NO. 6-434

PHASE I INSPECTION REPORT NATIONAL DAM INSPECTION PROGRAM



Prepared by:

WOODWARD-CLYDE CONSULTANTS
5120 Butler Pike
Plymouth Meeting, Pennsylvania 19462

Submitted to:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

JULY 1979

PHASE I INSPECTION REPORT NATIONAL DAM INSPECTION PROGRAM NEW KERNSVILLE DAM NATIONAL ID #PA 00723 DER #6-434

SECTION 1 PROJECT INFORMATION

1.1 General.

- a. <u>Authority</u>. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.
- b. <u>Purpose</u>. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. <u>Dam and Appurtenances</u>. New Kernsville Dam is a "run of the river" dam with limited storage capacity across the Schuylkill River. It is a concrete gravity structure with a central 600 foot ogee spillway section and a nonoverflow section at each end of the spillway. A 260 foot earth embankment joins the right nonoverflow section to the abutment. The overall length of the dam is 1,600 feet.

The ogee gravity spillway has a base width of 58.6 feet and a total height from the foundation to the crest of the nonoverflow section of 45 feet. The height of the spillway crest above the stream bed is about 33 feet. The bucket at the downstream toe of the spillway has a radius of 15 feet and a thickness of 5 feet, extending 16 feet downstream from the toe of the dam. The height of the nonoverflow section above the downstream apron is 44.88 feet. The dam foundation was grouted with holes extending 25 feet below the foundation on 5 foot centers.

The gravity nonoverflow sections at each end of the spillway have a width of 8 feet for the top 10.5 feet. Below this elevation, the downstream base batters at 7 on 10 and the upstream base has a batter of 1 on 20. Beyond the ends of the nonoverflow sections are earth embankments which tie the nonoverflow sections to natural ground. The earth embankment sections have a top width of about 30 feet consisting of about

- ll feet of. earth and 19 feet of rock. Both faces of the embankment have slopes of 3H:lV. The upstream face is protected with rock fill up to four feet thick and the downstream face with rock fill up to two feet thick. The upper portion of the embankment is reported to consist of impervious materials and the downstream portion to consist of a more pervious fill. The embankments are also reported to contain a centerline core trench excavated to rock. The core trench has a base width of 15 feet and side slopes of lH:lV.
- b. Location. The dam is located on the Schuylkill River, approximately 1.5 miles north of Hamburg, in Windsor Township, Berks County, Pennsylvania. The site is shown on USGS Quadrangle entitled "Auburn, Pennsylvania" at coordinates N 40° 34.4' W 76° 0.1'. A regional location plan of New Kernsville Dam is enclosed as Plate 1, Appendix E.
- c. <u>Size Classification</u>. The dam is classified as an "Intermediate" size dam by virtue of its 45 foot height and estimated 1,850 acre-foot total storage capacity.
- d. <u>Hazard Classification</u>. A "High" hazard classification is assigned consistent with the potential for extensive property damage and possible loss of life along the Schuylkill River downstream of the dam.
- e. Ownership. The dam is owned by the Department of Environmental Resources (DER), Office of Resource Management. All correspondence should be sent to Mr. Samuel R. Reed, Director, Bureau of Operations, Office of Resource Management, Department of Environmental Resources, Post Office Box 1467, Harrisburg, Pennsylvania 17120.
- f. <u>Purpose of Dam</u>. The purpose of this dam is to create a desilting basin.
- g. Design and Construction History. New Kernsville Dam was constructed as a result of Pennsylvania Act 441, "Schuylkill River Desilting Project", June 1945. New Kernsville Dam is one of a series of several dams along the Schuylkill River constructed to form desilting basins to trap coal sediment carried by the river.

Foundation investigations began September 3, 1947, with Sprague & Henwood, Incorporated. Completion date for the test borings was February 11, 1948. Justin & Courtney*, Philadelphia, Pennsylvania, designed the dam, which was constructed by Poirier & McLane Corporation under a Pennsylvania GSA (Department of General Services) Contract No. 100-1.

^{*} Justin & Courtney is now a division of O'Brien & Gere, Syracuse, New York.

Subsurface grouting was done by the Pennsylvania Drilling Company of Pittsburgh, Pennsylvania. Construction began June 1948, and was completed by November 10, 1949.

The dam was constructed in two stages by use of coffer dams and earth dikes. The left half of the dam was constructed first with diversion on the right side. During the second stage of construction, the river was diverted by means of three 4 x 5 foot conduits with concrete stoplogs to facilitate closure after construction. Several post-construction photographs were available for review in the final report prepared by the Schuylkill River project engineers, dated July 1, 1951. There were no construction photographs or construction reports available in DER files.

h. Normal Operating Procedures. All water flows over the weir of the spillway. Flood water storage capacity is minimal compared to the size of the drainage area. In the event spillway capacity is exceeded and the dam is overtopped, no damage would result. According to a memorandum dated March 12, 1948, from the Chief, Division of Dams, the overflow sections could be overtopped without serious damage. Mr. Courtney of Justin & Courtney confirmed that the dam could be overtopped without serious damage.

1.3 Pertinent Data.

. a.

A summary of pertinent data for New Kernsville Dam is presented as follows.

340

b.	Discharge at Dam Site (cfs) Maximum Known Flood (Tropical Storm Agnes, 1972, measured at downstream gaging station) At Top of Nonoverflow Section	42,800 83,400
c.	Elevation (feet above MSL) Top of Dam Spillway Crest Downstream Apron (toe) Normal Pool	393.88 383.0 350.0 383.0
đ.	Reservoir (miles) Length at Normal Pool Fetch at Normal Pool	1.25 0.60

Drainage Area (sq miles)

Storage (acre-feet) e. Normal Pool 583 At Top of Nonoverflow (est.) 1,260 f. Reservoir Surface (acres) Normal Pool 54 Dam Data g. Concrete gravity Type Length 1,600 feet Height (above downstream apron) 43.88 feet Crest Width (concrete nonoverflow section) 8 feet Volume 45,000 cu yds Concrete 7,000 cu yds Earth/Rock Cutoff Concrete sections founded in rock Grout Curtain Upstream single line grout curtain h. Spillway Туре Concrete ogee weir Elevation 383 feet Length 599.8 feet

NEW KERNSVILLE DAM CHECK LIST HYDROLOGIC AND HYDRAULIC ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Large, mountainous, greater than 55% wooded,
25% developed and 10% strip mining. ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 383 feet (583 Acre-Feet).
ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 393.88 feet (1250± Acre-Fe
ELEVATION MAXIMUM DESIGN POOL:
ELEVATION TOP DAM: 399.88 feet.
SPI LLWAY
a. Elevation <u>383 feet</u> .
b. Type Concrete ogee weir.
c. Width 600 feet.
d. Length
e. Location Spillover Central portion of structure.
f. Number and Type of Gates <u>None.</u>
OUTLET WORKS:
a. Type <u>Non-functional construction diversion conduits with</u>
concrete stop logs. b. Location
c. Entrance inverts <u>366.0 feet.</u>
d. Exit inverts <u>360.34</u>
e. Emergency draindown facilities
HYDROMETEOROLOGICAL GAGES:
a. Type Four reporting National Weather Service Stations within the
watershed. b. Location
c. Records <u>National Weather Service.</u>
MAXIMUM NON-DAMAGING DISCHARGE: Not determined.

New Kernsville Dam 108 No. Hydralogy / Hydraules Classification (Ref Recommended Gwdelines for Safety Inspection of Dams) I The hazard potential is rated as "High" as there would be lass of like it the dam failed. 2. The size classification is "Intermediate" based on its 45.9 H. height measured from end of downstream appoin. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PHF). Hydmlogy and Hydraulic Analysis I. Dasign Figuration Data. No original design data was atalledle. The "Application Report" evaluated the spillway capacity as 30,200 cts with a maximum depth of 10,88 H. This was considered adsonate. The maximum recorded discharge at the downstream gaging station at Serne, about 45 miles below the dam, was allowed in 1942 2. Evaluation of structure. New Kernsville Dam is a nured the river dam with very little flood strage capacity, therefore, reservoir routing was not done, and the spillway adequacy was deformine by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph defermined by the computer program Computer input as follows: damage area the design value verified from USB3 11350000 mays tainfall, shown, an sheet 7, ret. Hydrometerological Report 10, 33. 1 Report 10, 33. 1 Reference of the spillway Batimene, to Fore 6.	AYMF	B DATE 7/12/79	SUBJECT	SHEET <u>3</u> OF <u>8</u>
Classification (Ref-Recommended Giudelines for Satety Inspection of Dams) I The Mazard potential is rated as "High" as there would be loss of like it the dam failed. 2. The size classification is "Intermediate" based on its \$5.9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazare! Classification, is the Probable Haxmum Flood (PHF). Hydmlogy and Hydmulic Hnalysis I. Dasign/Figuluation Data. No prognal design data was alkalable. The "Application Report" evaluated the spillway capacity as 50,500 ets with a maximum depth in 88 H. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Serne, about 15 miles pelow the dam, was shoosets in 1942 2. Evaluation of structure. New Kernsville Dam is a "nur of the maximum with very little flood strage capacity, therefore, reservoir routing was not done, and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph determined by the computer prograv Computer input as to flows: Jufflow Hydrograph determined by the computer prograv Computer input as follows: Association of Structure of the Solicy value verified from USBS 1:250,000 mass Lastown on sheet 7, ret Hydrometerological Report No. 33 Information received from Corps of Open Engineers Battimene, for Zone 6			Mew Kernsville Dam	
Class Hichon (Ref-Recammended Gwdelmes for Safety Inspection of Dams) The hazard potential is tated as "High" as there would be loss of life it the dam failed. 2. The size classification is "Intermediate" based on its \$5.9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification is the Probable Haxmum Flood (PHF). Hydrology and Hydraulic Analysis 1. Design Fevaluation Data. No original design data was atailable. The "Application Report" evaluated the spillway apacity as 80,200 cts with a maximum depth of 10,88 H. This was considered adequate The maximum recepted discharge at the downstream gaging station at Berne, about \$5 miles below the dam, was Phoodats in 1942 P. Evaluation of structure. New Kernsville Dam is a "wood-the-river" dam with very little flood strange capacity, therefore, reservoir routing was not dong and the spillway adequacy was determined by comparing the intow hydrograph with spillway capacity. Inflow Hydrograph determined by the computer program Computer input as follows: drainage area - the design value verified from 1988 1:255000 maps tainfall shown on sheet 7, ret Hydrometerological Report No. 33 Snyder's hydrograph parameter, to For Information received from Copp of Open Engineers Baltimene, to Fore Copingers.			Hydrology / Hydraulics	
1. The hazard potential is tated as "High" as there would be loss of life it the dam fuled. 2. The size classification is "Intermediate" based on its \$3,9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PHF). Hydrology and Hydraulic Analysis 1. Dasign Fialwation Data. No original design data was available. The "Application Report" evaluated the spillway capacity, as \$0.200 cts with a maximum depth of lass It. This was considered adequate. The maximum recorded discharge at the downstream gaying station at Berne, about 165 miles balow the dam, was 24,000 ats in 1942. 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood strage capacity, therefore, reservoir routing was not done, and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer program Computer input as follows: Computer input as follows: Arainage area - the design value verified from USBS 11858000 maps rainfall, shown on sheet 1, ret. Hydrometerological. Report No. 33. Snydet's hydrograph parameter, tp. Cp. tp: Cf. (1: 162). G: 1:135 Information received from Corpo of Op.040 Engineers, Baltimora, for Eore 6.				
1. The hazard potential is rated as "High" as there would be loss of like it the dam failed. 2. The size classification is "Intermediate" based on its \$3,9 H. height measured from end of downstream apron. 3. The spillway design fload, based on size and hazard classification, is the Probable Haxmum Flood (PHF). Hydrology and Hydraulic Analysis 1. Dasign Fialwation Data. No original design data was available. The "Application Report" evaluated the spillway expacity as \$0.200 cts with a maximum depth of lass It. This was considered adequate. The maximum recepted discharge at the downstream gaying station at Berne, about 45 miles balow the dam, was 24,000 ets in 1942. 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood stringe capacity, therefore, reservoir routing was not done, and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer program Computer input as follows: Computer input as follows: drainage area - the dasign value verified from USBS 11250,000 maps rainfall, shown on sheet 1, ret. Hydrometerological. Report No. 33. Snyder's hydrograph parameter, tp, Cp. tp: 040 Engineers, Baltimora, for zone 6.	01		(Pal-Pages of Ad Gudal	ings for Safati
1. The hazard potential is rated as "High" as there would be loss of life it the dam failed. 2. The size classification is "Intermediate" based on its \$3,9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PHF). Hydrology and Hydraulic Analysis 1. Dasign Fialuation Data. No original design data was available. The "Application Report" evaluated the spillway capacity as 80,200 cts with a maximum depth of lass It. This was considered adequate. The maximum recorded discharge at the downstream gaying station at Berne, about 45 miles balow the dam, was 24,000 ats in 1942. 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood strage capacity, therefore, reservoir routing was not done, and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer program Computer input as follows: Computer input as follows: drainage area - the dasign value verified from USBS 11250,000 maps rainfall, shown on spect 1, ret. Hydrometerological. Report No. 33. Snyder's hydrograph parameter, tp. Cp. tp. Cq. U.S. Information received from Corps of Cp. 040 Engineers, Baltimora, for Eore 6.	C10	2.SSI fication	(ref- recommensed cruder	mes for Carely
2. The size classification is "Intermediate" based on its \$3.9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PMF). Hydrology and Hydraulic Amalysis 1. Design Figuration Deta. No original design data was attailable. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 H. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was attooods in 1942 2. Evaluation of structure. New Kernsville Pan is a run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph defermined by the computer prograve Computer input as follows: drawage area the design value verified from USBS 1:250.000 maps transcall shown on sheet 7, ret. Hydrometerological Report No. 33. Snyder's hydrograph parameter, top CR. tp: 040 Engineers, Baltimora, for Zone 6.			mopecinori di	
2. The size classification is "Intermediate" based on its \$3.9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PMF). Hydrology and Hydraulic Amalysis 1. Design Figuration Deta. No original design data was attailable. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 H. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was attooods in 1942 2. Evaluation of structure. New Kernsville Pan is a run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph defermined by the computer prograve Computer input as follows: drawage area the design value verified from USBS 1:250.000 maps transcall shown on sheet 7, ret. Hydrometerological Report No. 33. Snyder's hydrograph parameter, top CR. tp: 040 Engineers, Baltimora, for Zone 6.				
2. The size classification is "Intermediate" based on its \$3.9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PMF). Hydrology and Hydraulic Amalysis 1. Design Figuration Deta. No original design data was attailable. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 H. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was attooods in 1942 2. Evaluation of structure. New Kernsville Pan is a run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph defermined by the computer prograve Computer input as follows: drawage area the design value verified from USBS 1:250.000 maps transcall shown on sheet 7, ret. Hydrometerological Report No. 33. Snyder's hydrograph parameter, top CR. tp: 040 Engineers, Baltimora, for Zone 6.		The hazaro	potential is rated as "High	b" as there would
2. The size classification is "Intermediate" based on its \$3.9 H. height measured from end of downstream apron. 3. The spillway design flood, based on size and hazard classification, is the Probable Haxmum Flood (PMF). Hydrology and Hydraulic Amalysis 1. Design Figuration Deta. No original design data was attailable. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 H. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was attooods in 1942 2. Evaluation of structure. New Kernsville Pan is a run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph defermined by the computer prograve Computer input as follows: drawage area the design value verified from USBS 1:250.000 maps transcall shown on sheet 7, ret. Hydrometerological Report No. 33. Snyder's hydrograph parameter, top CR. tp: 040 Engineers, Baltimora, for Zone 6.		be loss o	I life it the dam tailed.	
3. The spillway design fload, based on size and hazard. classification, is the Probable Maximum Flood (PMF). Hydrogy and Hydraulic Analysis 1. Design Figuration Data. No prignal design data was alkillable. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10,88 ft. This was considered adequate. The maximum recorded discharge, at the downstream gaging station at Berne, about the miles below the dam, was attoorable in 1942 2. Evaluation of structure. New Kernsville Dam is a "rw-of-the-river" dam with very little flood strage capacity, therefore, reservoir routing was not done, and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - defermined by the computer program Computer input as follows: drainage area - the design value verified from USAS 11250,000 maps rainfall, shown on sheet 1, ret. Hydrometerological Report No. 33 Sinyder's hydrograph parameter, to, Cp. tp: C(Li Lea) or 50,000 maps				
3 The spillway design fload, based on size and hazard. classification, is the Probable Maximum Flood (PMF). Hydmlogy and Hydraulic Analysis 1. Dasign Fialuation Data. No prignal design data was altailable. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10,88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was attoorate in 1942 2. Evaluation of structure. New Kernsville Dam is a "rw-of-the-river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - defermined by the computer program Computer input as follows: drainage area - the design value verified from USAS 11250,000 maps rainfall, shown on sheet 1, ret. Hydrometerological Report No. 33 Snyder's hydrograph parameter, to, Cp. tp: C(Li Lea) or Ge: USS Information received from Corps of Cp: 040 Engineers, Baltimora, for Zone Co.		height me	classification is pricemedic	raym aprop
Hydrology and Hydraulic Analysis I. Dasign Fivaluation Data. No original design data was available. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was atoooets in 1942 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograve Computer input as follows: drainage area - the design value verified from USBS 11250,000 maps tainfall shown on sheet 7, ref. Hydrometerological Report No. 33 Snyder's hydrograph parameter, to CR. Let Le C. (L' Lea) "S. Information received from Corps of CR: 1.35 Information received from Corps of CR: 0.40 Engineers, Baltimera, for Zonz Co.				**・ **********************************
Hydrology and Hydraulic Analysis I. Dasign Fivaluation Data. No original design data was available. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was atoooets in 1942 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograve Computer input as follows: drainage area - the design value verified from USBS 11250,000 maps tainfall shown on sheet 7, ref. Hydrometerological Report No. 33 Snyder's hydrograph parameter, to CR. Let Le C. (L' Lea) "S. Information received from Corps of CR: 1.35 Information received from Corps of CR: 0.40 Engineers, Baltimera, for Zonz Co.		3. The spillw	ay design flood, based on si	ize and hazard
Hydrology and Hydraulic Analysis I. Dasign Fivaluation Data. No original design data was available. The "Application Report" evaluated the spillway capacity as 80,200 cfs with a maximum depth of 10.88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was atoooets in 1942 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood strage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograve Computer input as follows: drainage area - the design value verified from USBS 11250,000 maps trainfall shown on sheet 7, ref. Hydrometerological Report No. 33 Snyder's hydrograph parameter, to CP. 1p: Cf (L: Lea) of Grenother received from Corps of Cp: 0.40 Engineers, Baltimera, for Zonz lo.		classifica	tion, is the Probable Maximi	im Flood CPMF).
1. Dasign Evaluation Data. No priginal design data was available. The "Application Report" evaluated the spillway capacity as 80,200 cts with a maximum depth of 10.88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about the miles below the dam, was station in 1942 2. Evaluation of structure. New Kernsville Dam is a "run-of the niver" dam with very little flood strage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer program Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps tainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, to, Cp. 19:040 Engineers, Baltimora, for Fore lo.			<u> </u>	
aikilable. The Application Report evaluated the Spillway Capacity, as 80,200 cfs with a maximum depth of ID 88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about 45 miles below the dam, was 24,000 ets In 1942 P. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood strage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as pollows: drainage area - the design value verified from USBS 1:250,000 maps tainfall, shown on sheet 7, ret. Hydrometerological Report No. 33 Snyders hydrograph parameter, to CR The Cf. 1.35 Information received from Corps of Cp:040 Engineers, Baltimora, for Zone 6.	<i>Hy</i>	dro logy and F	tyamulic Hhalysis	
aikilable. The Application Report evaluated the Spillway Capacity, as 80,200 cfs with a maximum depth of ID 88 ft. This was considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about 45 miles below the dam, was 24,000 ets In 1942 P. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood strage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as pollows: drainage area - the design value verified from USBS 1:250,000 maps tainfall, shown on sheet 7, ret. Hydrometerological Report No. 33 Snyders hydrograph parameter, to CR The Cf. 1.35 Information received from Corps of Cp:040 Engineers, Baltimora, for Zone 6.		1. Design/E	valuation Data. No origina	I design data was
Capacity as 80,200 cts with a maximum depth of 10.88 ft This was Considered adequate. The maximum recorded discharge at the downstream gaging station at Berne, about 1,55 miles below the dam, was 24,000 ets in 1942 2. Evaluation of structure. New Kernsville Dam is a "run of the river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph farameter, to CP. tp: Ct (1: Lea)." Cq: 1.35 Information received from Corps of Cp: 0.40 Engineers, Baltimora, for Zorze (6.		ainilabl	e. The "Application Report"	evaluated the spillway
recorded discharge at the downstreem gaging station at Berne, about 45 miles below the dam, was 24,000 ets in 1942 2. Evaluation of structure. New Kernsville Dam is a "run-of-the-river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as tollows: Arainage area - the design value verified from USAS 1:250,000 maps tainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp. Cp. tp: Cf (Li Lea). Ge: 0.40 Engineers, Baltimora, for Zone 6.		capacit	y as 80,200 cts with a mo	aximum depth of
2. Evaluation of Structure. New Kernsville Dann is a "rwn-of-the-river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USOS 1:250,000 maps tainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, to, CR tp = C(L+1 Lea) Cp: 0.40 Engineers, Baltimora, for zone 6.		10.88 +	t This was considered a	dequate. The maximum
2. Evaluation of Structure. New Kernsville Dann is a "rwn-of-the-river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USOS 1:250,000 maps tainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, to, CR tp = C(L+1 Lea) Cp: 0.40 Engineers, Baltimora, for zone 6.		record of Roy	ed discharge at the down	the dam was 24000
New Kernsville Dam is a "rwo-of-the-river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer program Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, to CP. tp: Cf (+ Lea). The formation received from Corps. of Co:040 Engineers, Baltimore, for Zone 6.				
New Kernsville Dam is a "rwo-of-the-river" dam with very little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by Comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer program Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, to CP. tp: Cf (+ Lea). The formation received from Corps. of Co:040 Engineers, Baltimore, for Zone 6.				
little flood storage capacity, therefore, reservoir routing was not done and the spillway adequacy was determined by comparing the inflow hydrograph with spillway capacity. Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33 Snyder's hydrograph parameter, tp. Cp. tp: C4 (t Lea). C9:040 Engineers, Baltimora, for Zone 6.		? Evaluation	of structure.	11 / 1/
Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp, Cp tp = C4 (Li Lea) 0.3 G=1.35 Information received from Corps of Cp=0.40 Engineers, Baltimora, for Zone 6.		New Ke	rnsville Lan is a run-of-the	e-nuer dam with very
Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp, Cp tp = C4 (Li Lea) 0.3 G=1.35 Information received from Corps of Cp=0.40 Engineers, Baltimora, for Zone 6.		little fl	and storage capacity, Thereto	odeouncy was determine
Inflow Hydrograph - determined by the computer prograv Computer input as follows: drainage area - the design value verified from USAS 1:250,000 maps rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp, Cp tp = C4 (Li Lea) 0.3 G=1.35 Information received from Corps of Cp=0.40 Engineers, Baltimora, for Zone 6.		by Con	parine the in How hydrograph	'n with spillway capacity.
Trainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp, Cp. tp = CL (Li Lea) 2.3 Cp=0.40 Engineers, Baltimora, for Zone 6.				
Trainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp, Cp. tp = CL (Li Lea) 2.3 Cp=0.40 Engineers, Baltimora, for Zone 6.		Inf	low Hydrograph - determined	by the computer program
rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33 Snyder's hydrograph parameter, tp, Cp tp = CL (LLa) 0.3 Cp=0.40 Engineers, Baltimora, for Zone 6.			amputer input as follows:	und a kandak lang
rainfall, shown on sheet 7, ref. Hydrometerological Report No. 33. Snyder's hydrograph parameter, tp, Cp tp = Ct (L'Lea) 0.3 Ct = 1.35 Information received from Corps of Cp=0.40 Engineers, Baltimora, for Zone 6.				Value Verittea Trom
Snyder's hydrograph parameter, tp, Cp tp = Ct (L'Lea) of Cp=0.40 Engineers, Baltimora, for Zone 6.	: ;		rainfall, shown on sheet	7, ret. Hydrometerological
tp = Ct (Li Lea) or Grantian received from Corps of Cp=0.40 Engineers, Baltimora, for Zore 6.			Report No. 33	
Cp=0.40 Engineers, Baltimore, for Zone 6.			Snyder's hydrograph param	eter, tp.Cp.
Cp=0.40 Engineers, Baltimore, for Zone 6.			tp = Ct (Li Lca)	time the Command
			Cp=0.40 Enginee	rs. Baltimore for Zone lo
L = 35,88mi, from USGS, 1:24000				
to= 1,35(35.88.26.78)0.3			tp= 1,35(35.88.26.78)	
= 10.60			- 10.60	

	B DATE 2/	
(O. BY	DATE	
AU-L-10/02-11/02-11/02-11/02-11/02-11		Hydrology / Hydraulias
		Spillway Capacity Ref. Chow, Open Channel Hydraulics, p.364
		Hydraulics, p.364
		$X'' = KH_2'''Y$
		III - daria hand by all dies y alough head
	- 	Ha = design head excluding velocity head
 		of approach
		n = 1.836 for 1 H:3V u/s face of weir
		M=1.936 " " - "
 		
 		Harz Dist. X Y Hd
		# X15
	1 comme	4'083" 0 0 -
1		fr. XIS 4' 0'3" 0 0 — B' 1'8 408' 93/4" 12.25
1	 	
·	└ ─├─	
		13'6" 958' 3'58 14.65
	. <u> </u>	
		use Hd = 14 Pt.
 		
 		
		USBR, Design of Small Daws, p. 372
		assume Co = 3.92 Q = 14 12:600. 3.92 = 123,200
		height of weir ~ 23 At, ave channel width ~ 800 H
 	 	Theight of well 19371, we change with the
 		w = 123,200/(37 x 600) = 5.5 /4/sec
		velocity head ~ 0.48ft
		Ho (design head): 14.48 on 14.5 ft
++++	+	to a good a contract to all
	 	Co = 3,92.0.97 = 3,80 when pool is at top of
	<u> </u>	non overflow section
		maximum spillway capacity
		Q=3.80,600. 11.38 1/2
		0.00.600.71.00
	<u> </u>	0 - 87, 500 cfs assuming weir is not submerged
	<u> </u>	and velocity head is 0.5 ft.
		Estimate of Tailwater Level
	 	5 = 0.00417 from Water Resources Bulletin No
	1	
<u> </u>		section about 200 ft downstream
		Area ~ 7632 ft2 w/ water level @ 383.
		in p ~ Die Et trans section estimated
· · · · · · · · · · · · · · · · · · ·	1 - 1 - 1	1/60/6
		1 149 2 43 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
· · · · ·		Q= A 11 R 2/3 So 1/2
		1.49 (7632) 43 = 7632 0.035 (716) 0.00417 12
		= 7/22 0035 (71/) 0.00417 12
	; ! !	
<u> </u>		
		= 10 1, 600 cts therefore, weir is not expected to

av HFB	DATE_7/14/79	SUBJECT	SHEET OF &
'(KD. BYDATE		New Kernsville Dam	JOB No
		Hydrology / Hydraulics	
	Spillway Add	aguacy	
	As the	spillway discharges more to	han O.S. PMF but
	less than	spillway discharges more to lapate without over toppin the spillway is rated as	the nonovertlow
	sections	the spillway is rated as	Inadequate Out
	, nar Jen	jously Inadequate."	
			• • • • • • • • • • • • • • • • • • • •

