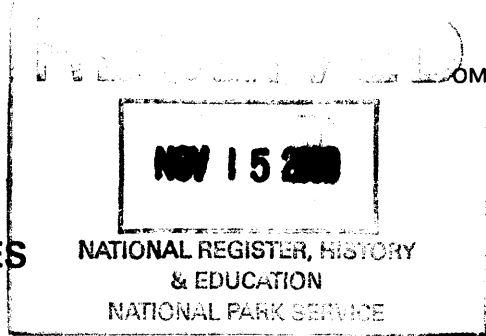


United States Department of the Interior
National Park Service

1571



NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Waterways Experiment Station

other names/site number WES, Original Cantonment

2. Location

street & number District bounded by Spillway at SE corner, to bridge over Durden Creek at SW corner, to Tennessee Road at West edge until intersection with Arkansas Road at NW corner, to NW corner of Residence No. 1, East across the Experiment Station Lake (Brown's Lake), South along high water mark East shore of lake to NE corner of Dam Spillway. See Map. not for publication

city or town Vicksburg vicinity state Mississippi code MS county Warren code 057 zip code 39180-6199

149

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register Criteria. I recommend that this property be considered significant nationally statewide locally. (See continuation sheet for additional comments.)

Paul D. Rubenstein 24 October 2000
Signature of certifying official Date

Paul D. Rubenstein, USACE Federal Preservation Officer
State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. (See continuation sheet for additional comments.)

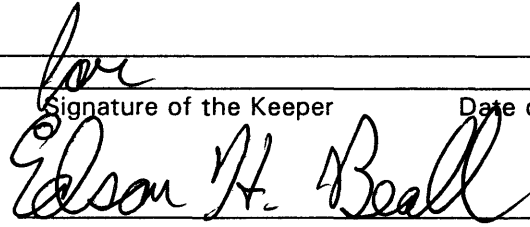
Kenneth H. P'Pool JUNE 30, 2000
Signature of commenting or other official Date

Kenneth H. P'Pool
Deputy State Historic Preservation Officer, Mississippi Department of Archives and History
State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

- entered in the National Register
 - See continuation sheet
- determined eligible for the National Register
 - See continuation sheet.
- determined not eligible for the National Register.
- removed from the National Register
- other, (explain:)


 Signature of the Keeper Date of Action
 Edson H. Beall 12/13/08

5. Classification

- | | |
|--|---|
| Ownership of Property
(Check as many boxes as apply) | Category of Property
(Check only one box) |
| <input type="checkbox"/> private | <input type="checkbox"/> buildings |
| <input type="checkbox"/> public-local | <input checked="" type="checkbox"/> district |
| <input type="checkbox"/> public-State | <input type="checkbox"/> site |
| <input checked="" type="checkbox"/> public-Federal | <input type="checkbox"/> structure |
| | <input type="checkbox"/> object |

Number of Resources within Property (Do not include previously listed resources in the count)	
Contributing	Noncontributing
5	0
	buildings
0	0
	sites
3	1
	structures
0	0
	objects
8	1
	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple listing.)
N/A

Number of Contributing resources previously listed in the National Register
0

6. Function or Use

Historic Functions
(Enter categories from instructions)
Proposed Historic District

Current Functions
(Enter categories from instructions)
Proposed Historic District

Cat: Defense Sub: Military Facility

Cat: Defense Sub: Military Facility

Commander's Residence

Commander's Residence

Cat: Domestic Sub: Single Dwelling

Cat: Domestic Sub: Single Dwelling

Hydraulics Laboratory

Hydraulics Laboratory

Cat: Education Sub: Research Facility

Cat: Education Sub: Research Facility

Dam/Brown's Lake/Spillway

Dam/Brown's Lake/Spillway

Cat: Industry Sub: Waterworks

Cat: Industry Sub: Waterworks

WES Historic District
Name of Property

Warren County, Mississippi
County and State

7. Description

Architectural Classification

(Enter categories from instructions)

Other--WES Style _____

Materials

(Enter categories from instructions)

foundation concrete

walls brick, concrete

roof clay tile, asphalt shingle, asbestos tile

other copper trim

Narrative Description

(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

A Property is associated with events that have made a significant contribution to the broad patterns of our history

B Property is associated with the lives of persons significant in our past.

C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

Mark "X" in all the boxes that apply.)

Property is:

A owned by a religious institution or used for religious purposes.

B removed from its original location.

C a birthplace or a grave.

D a cemetery.

E a reconstructed building, object, or structure.

F a commemorative property.

G less than 50 years of age or achieved significance within the past 50 years.

Narrative Statement of Significance

(Explain the significance of the property on one or more continuation sheets.)

Areas of Significance

(Enter categories from instructions)

Engineering

Architecture

Period of Significance

1929-1949

Significant Dates

1930

Significant Person

(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

N/A

Architect/Builder

U.S. Army Corps of Engineers

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested.
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey

Primary location of additional data:

- State Historic Preservation Office
- Other State Agency
- Federal Agency
- Local Government
- University
- Other

 recorded by Historic American Engineering Record
HAER, MISS, 75-VIC,27

Name of repository: Library of Congress

10. Geographical Data

Acreage of Property circa 16

UTM References

(Place additional UTM references on a continuation sheet)

1. Zone Easting Northing
15 700450 3575300

3. Zone Easting Northing
15 700800 3575050

2. Zone Easting Northing
15 700800 3575300

4. Zone Easting Northing
15 700450 3575050

See continuation sheet.

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Ezra E. Abraham, AIA, Historical Architect date October 1, 1999
organization CX for Preservation of Structures & Buildings, Seattle District US Army Corps of Engineers
street & number 4735 E. Marginal Way South telephone 206-764-3444
city or town Seattle state Washington zip code 98124-3755

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

- A **USGS map** (7.5 or 15 minute series) indicating the property's location.
- A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items

(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name Waterways Experiment Station, US Army Corps of Engineers

street & number 3909 Halls Ferry Road telephone (601) 634-2404

city or town Vicksburg state MS zip code 39180-6199

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

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National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 1

WES Historic District
Warren County, Mississippi

Narrative Description Of Historic, And Current, Condition Of Contributing Resources In The Historic District

General Physical Relationships

Located in the original cantonment of the Waterways Experiment Station (WES), the WES Historic District consists of five buildings, and three structures constructed between 1930 and 1931. The historic district is organized about the original two-story neo-Federal Hydraulics Lab (Building 1006). The U.S. Army Corps of Engineers built the structure in 1930. The Lab was originally designed as a full-height two-story main hall with office/administration wings abutted perpendicularly at each end. It was fully daylighted on the south facing elevation. The building has been significantly altered with additions and betterments throughout the years. An annex was completed in the 1940's at the southeast corner of the building, doubling the square footage of the Hydraulics Lab. The brick façade and roof of the original Lab are still intact. The original large expanse of industrial steel-sash windows on the main elevation have been replaced with gravel aggregate panels. The site is heavily wooded and hilly. The Laboratory is located in a depression of the original Durden Creek, along the intersection of Arkansas Road and Tennessee Road.

Immediately above and behind the Hydraulics Lab is a 400-foot long earthen dam structure which forms the northern border of the historic district. The face of the dam is grassy on both sides with forest and Kudzu vine growing along the reservoir perimeter. The impounded water of the Brown's Lake reservoir provided water for the experimental hydraulic models built in and around the Hydraulics Lab. The dam is 19 feet tall with 1-on-3 slopes. The original lake was 24 acres but is now much reduced in size due to silt build-up over the years. The lake is very scenic and the site of at least one picnic area for the station.

On a hill above the dam, overlooking Brown's Lake, is the one-story brick Commander's Residence (Building 4001) which forms the northwest corner of the historic WES district. This building is a fine local example of Tudor Revival residential architecture and is individually eligible for the NRHP under Criterion C. The building site is on a grassy knoll along Tennessee Road, the first of several residences built for key employees of WES and the Mississippi River Commission.

Located on top of the dam, accessed by Tennessee Road, are the Pump House (Building 1005) and the Gauge House (Building 4023). These two brick conical-roofed buildings functioned in concert with one another to regulate water supply for the hydraulic laboratory experiments down stream.

Adjacent to the earthen dam is the eastern edge of the historic district formed by the concrete and gravel Spillway. This utilitarian structure discharged excess water from the reservoir and contained many temporary waterway experiments in the lower spillway channel during the 1930's. The southeast corner of the district is formed at the non-contributing bridge where Mississippi Road

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 2

WES Historic District
Warren County, Mississippi

crosses the spillway. The district's southwest corner is located at the intersection of Mississippi Road and Tennessee Road.

To the west of the Hydraulics Lab is a brick Tool Shed (Building 1071) which was associated with the hydraulic experiments in the nearby Laboratory.

Detailed Description of Contributing Buildings and Structures in the Historic District

Pump House (Building 1005) (see figure 1) Located on the lakeside of Spillway near Commander's residence and dam entry road. Original cost was \$300.00. Area is 57 SF. Built in September 1934, by hired labor. This was a flood control project for the Lab. Materials found in the Pump House: Foundation- Concrete, Floor- Concrete, Walls- Brick, Roof- Asbestos Shingles, Circumference 27' 3". No additions or betterments are evident.

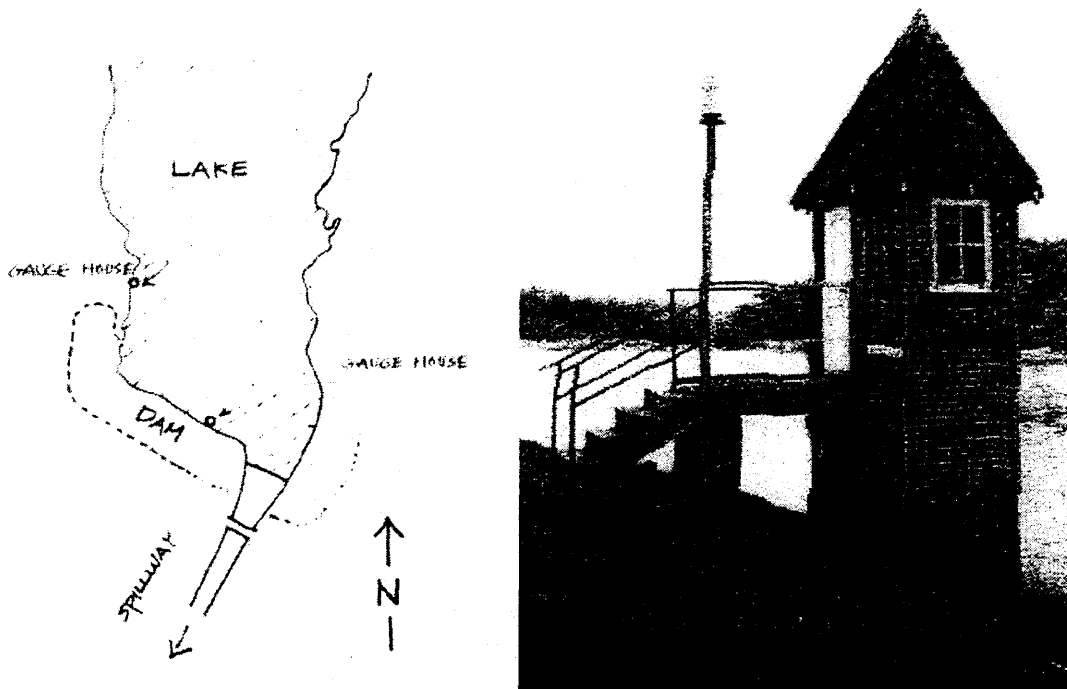


Figure 1: Pump House (Building 1005)

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National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 3

WES Historic District
Warren County, Mississippi

Storage Building (Building 1071) (see figure 2) Original cost was \$4,817.93. The building area is 300 SF. Built September 1934. Foundation is concrete, floor is concrete, walls are brick, roof is sheet metal. Architect was the Corps of Engineers in-house design. Post-historic changes and dates: None except new metal roof. Property name historically was the "Colored Lavatory". Property name currently is Building 1071, Tool Storage. Former/historic use(s): African-American employee lavatory according to 1934 site plan legend designation. Present use: Storage of miscellaneous tools and equipment.

Brief description: One-story load-bearing masonry structure with a low-pitched gable roof. The L-shaped building is of red brick with running bond pattern and headers at each 7th course. Paired and single 6/6 double hung wood sash. Concrete wing walls. Attached flue. The building is set into landscape with attached wing walls. Architectural character or style is utilitarian. The tool and equipment house is complete and unaltered. Architectural or historical importance is its association with WES historic district.

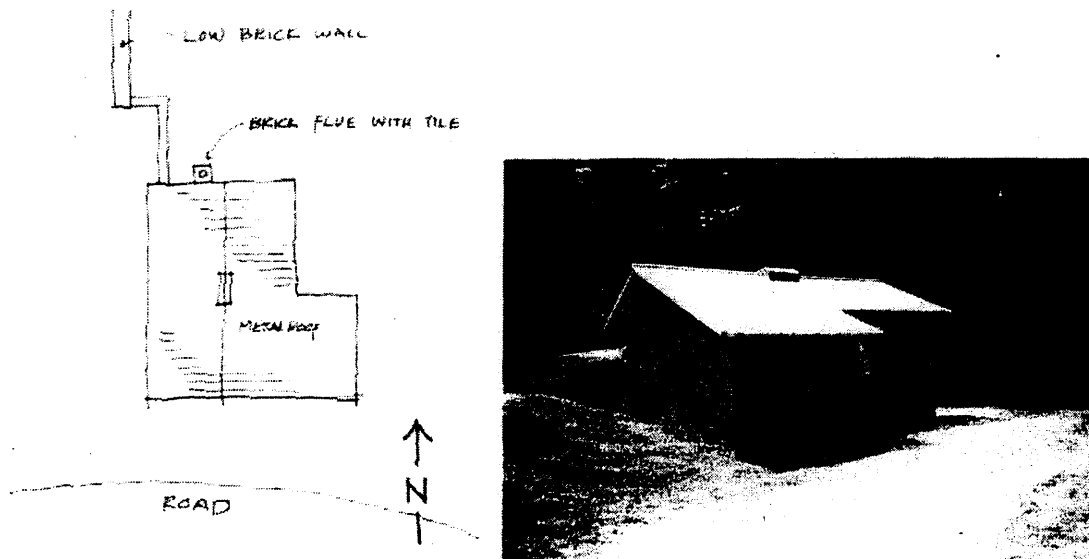


Figure 2: Storage Building (Building 1071)

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 4

WES Historic District
Warren County, Mississippi

Gauge House (Building 4023) (see figure 3), Flood Control Project. Building area is 32 SF. Built in the 1930's at an original cost of \$1000.00. Foundation is brick, floors are wood, walls are brick, roof is asbestos shingles. No additions or betterments are noted.

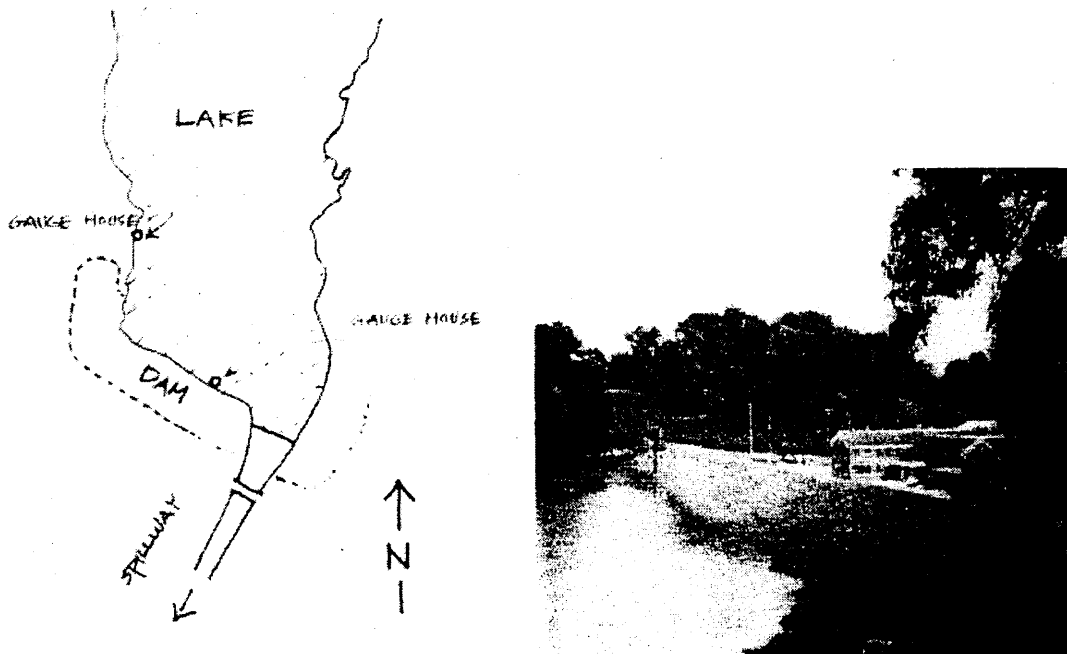


Figure 3: Gauge House (Building 4023)

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NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 5

WES Historic District
Warren County, Mississippi

Quarters No. 1 (Building 4001) (see figure 4), Original construction cost was \$25,685.79. Date of construction is documented as 11/30/1930. Material used in construction were brick and stone. Concrete was used for the basement and garage, slate was used for the roof.

The commanding officer's residence is a Tudor Revival house of exceptional quality. A reasonably compatible addition to the front of the structure does not diminish its integrity. This is a one-story load-bearing brick structure with a gable roof. Stone quoins, headers at every eight courses, and raised brick joints are typical throughout the construction. Diagonally divided-light casement wood windows, rustic slab doors, and ornate rustic period hardware are present which contribute to the Tudor Revival style. Half-timber gables, slate roof, copper gutters and downspouts are used. This is an intact building of high quality design and construction.

Architectural character and style is Tudor Revival. Downstairs is the basement which has one bath, three rooms, storage facilities for heating unit and garage. Upstairs is the main floor with six rooms and sun porch with two baths. Area of the residence today is 2,736 SF. Property name historically was "Residence for Director of WES". Property name commonly used today is "Quarters No. 1", "Building 4001", and "Vogel House". Location of the residence is on the west side of Brown's Lake. Present use continues to be the residence of the WES commander. A significant person associated with the property is General H.D. Vogel, the founder and first commander of WES. Date of association with then-Lieutenant Vogel is from 1939 to 1945. Architect for the residence was Jeff Posey, of the Corps of Engineers, as an in-house design.

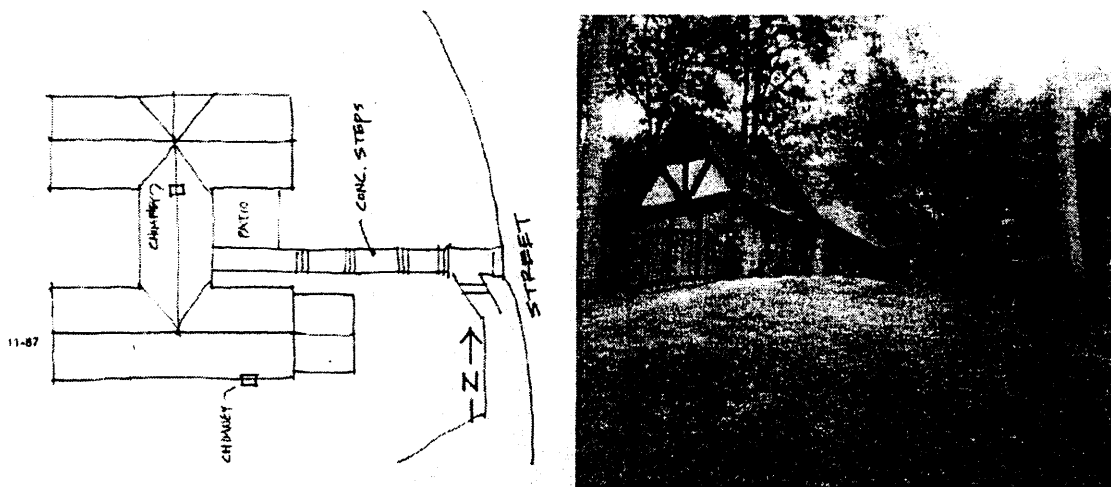


Figure 4: Quarters No. 1 (Building 4001)

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 6

WES Historic District
Warren County, Mississippi

Environmental Lab Headquarters (Building 1006) (see figure 5) This was the original headquarters building of the installation. It has been altered after fire damage in 1960. Property name historically was "WES Headquarters Building". Property name commonly used today is "Environmental Laboratory Building". The property is located on the corner of Arkansas and Tennessee Streets. Former use was as the hydraulics testing laboratory, office, and administration. Presently the building is used for offices, teaching, and as an auditorium by the Environmental Laboratory. Architect of the building was the Corps of Engineers as an in-house project. The lab building is associated with the original cantonment and adjacent lake, dam, and spillway. It is associated with WES as the station's first permanent building, completed in 1931. Original area: 18,456 SF, present area 59,338 SF (includes annex), Building make-up, including additions and betterments, is concrete, concrete blocks, brick, asbestos shingles, wood, structural steel. This is a two-story brick veneer structure with gable roof, gable-end rake returns, and roof-mounted vents. Original decorative main entrance has a Corps of Engineers castle which remains intact. Condition of the building is good.

After the building was partially destroyed by fire in 1960 aluminum windows, asphalt shingles, and exposed aggregate wall panels were added that changed the historical fabric of the building's exterior. Architectural character or style: Neo federal. Historical or thematic contexts are with the Waterways Experiment Station, 1929-1945, the Federal Government, and the U.S. Army Corps of Engineers. The annex to original headquarters building is also in good condition. The annex is intact except for the replacement of original doors and windows with aluminum units. The annex building is an integral component of the Environmental Lab HQ building as part of the proposed historical district.

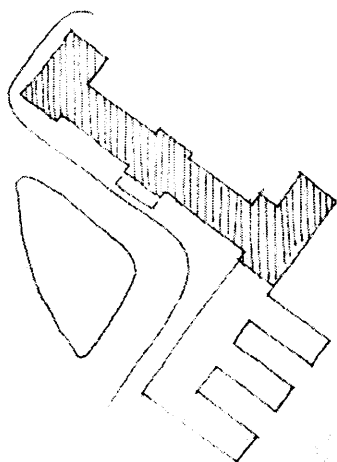


Figure 5: Environmental Lab HQ and annex (Building 1006)

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 7

WES Historic District
Warren County, Mississippi

Lake/Dam/ Spillway/Exit Channel (see figure 6) Records reflect an acquisition date of 1930. Original cost is not known. Property name historically was "WES Dam Complex." Property name commonly used today is "Brown's Lake", and "Dam & Spillway Complex." Historic use was water supply for hydraulic experiments. Present use is as a recreational open space. Design done by the Corps of Engineers, in-house project. The Lake, Dam, and Spillway complex work in coordination with the water-level gauge house and pump house. This is a landscaped and carefully composed complex which is the major manmade feature in the proposed WES historic district. Principal materials are brick, concrete, and earthworks. Architectural character or style is utilitarian.

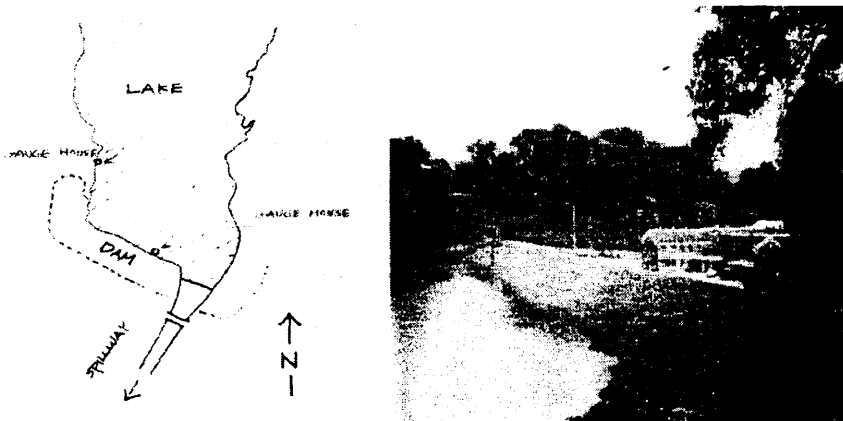


Figure 6: Lake/Dam/Spillway/Exit Channel

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 8

WES Historic District
Warren County, Mississippi

Statement of Significance

Under Criterion 'A' the WES historic district is associated with engineering events that have made significant contributions to the broad patterns of our history. Additionally, under Criterion 'C' the Commander's Residence, Building 4001, is a locally significant structure which embodies distinctive characteristics of Tudor Revival architecture.

The U.S. Army Corps of Engineers relies on WES to perform studies in all phases of its operational mission. Part of the Corps' mission is to act as the primary national agency responsible for flood control, river and harbor navigation, and numerous other activities involving hydraulic engineering. WES was established originally to assist the Corps only in that area of its mission before expanding into other engineering fields. WES has now served as the Corps' preeminent hydraulic engineering facility for nearly seven decades. Nonetheless, as the name "Waterways" Experiment Station implies, the institution's original focus was hydraulic research. The Hydraulics Laboratory predates its fellow laboratories in pedigree, and most of WES's early activities were devoted to hydraulic studies. The history of WES begins with those pioneering efforts.

Facts & Circumstances In The District's History Which Led To Its Significance Under Criterion 'A':

1927 Mississippi Flood

The waters covered 26,000 square miles of land. Approximately 637,000 people were displaced while 214 lost their lives. Property damage was assessed at \$236 million. That was the flood of 1927. It was also the driving force behind the creation of a small national hydraulics laboratory now known as the U.S. Army Engineer Waterways Experiment Station (WES).

The need for a national laboratory to study flood control had been promoted for several years by various people in Congress and other branches of government. In 1924 a congressional committee drafted a resolution proposing such a facility that had the backing of several officials, including then Secretary of Commerce Herbert Hoover. The measure died however due to flagging political support. Then came the 1927 flood. In the wake of the massive destruction new interest was generated in establishing a national hydraulics laboratory. This idea was strongly supported by the newly elected President, Herbert Hoover. Supporters of the idea wanted the laboratory located in the Washington, D.C., area and put under the jurisdiction of the National Bureau of Standards. The Corps of Engineers argued that if the laboratory was to be a practical tool it must be located near the problem requiring solution; in this case the Mississippi River.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 9

WES Historic District
Warren County, Mississippi

This new proposal for such a laboratory seemed to be dying until the then Chief of the Corps of Engineers, Major General Edgar Jadwin, issued a directive on June 18, 1929, to establish a hydraulics laboratory at or near Memphis, Tennessee. Jadwin used his authority granted under the Flood Control Act of 1928, which stated that whatever steps were necessary for flood control should be taken, as the basis for his directive.

When the decision was made later to move the Mississippi River Commission headquarters from St. Louis, Missouri, to Vicksburg, Mississippi, it was decided that the new hydraulics laboratory would be built there too and put under their jurisdiction. Construction began in early 1930. A young engineer officer who had been in Germany studying hydraulics, Lieutenant Herbert D. Vogel, was assigned as the first commander of WES. He guided WES through the important formative years of construction and assembling a staff.

Innovative Use of Hydraulic Models

Author Ben Fatherree, in his unpublished book *History of the WES Hydraulics Lab*, describes the principle of hydraulic model experiments done at WES:

In the last quarter of the 19th century a modest number of European engineers began to study hydraulic processes through a revolutionary and controversial method: small-scale modeling of actual river and harbor prototypes. "Prototype" in this case refers to the original, full-size natural phenomenon or structure that is reproduced with a model. These model studies relied on the "Principle of Similitude," which Sir Isaac Newton had defined in his monumental *Principia Mathematica* in 1686. Similitude held that if two geometric figures were drawn so that all corresponding lines were of the same ratio and their corresponding angles were of the same degree, the two figures were "similar," and all the properties of one could be determined from the other.

Expanding Newton's concept to include the small-scale reproduction of natural phenomena such as rivers and harbors, engineers theorized that the hydraulic behavior of prototypes could be studied accurately, rapidly, and inexpensively, with models. Realizing that reproduction of an exact scale-model of such a large and complex entity as a river valley was generally impossible, early model designers noted that a certain amount of "distortion" was necessary in a model to produce the phenomena occurring in the prototype.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 10

WES Historic District
Warren County, Mississippi

For example, a model of a 100-mile river reach built with a horizontal scale of 1:1,000 would be 528 feet long. For a wide but relatively shallow river like the Mississippi, a 1-mile wide section of the river would be 5.28 feet wide in the model, an easily constructed and functional unit. However, a 50-foot deep section of river channel at the same ratio would be a mere 0.05 feet (0.6 inches) deep in the model, and could not simulate flows or other conditions. Shallow areas could not be reproduced in a model at all. Model designers accordingly learned to employ larger scales to simulate channel depths - the vertical scale when compared to the horizontal scale in the same model, and to exaggerate slopes to achieve proper depths and flows.

Materials used in models could not adhere to the principle of geometric similitude in many cases. Sand for the bed of a river model with a scale of 1:1,000 would be microscopic. Instituting the concept of "hydraulic similitude," engineers thereby subordinated precise model replication of the dimensions of a prototype to the creation of conditions in a model that simulated the empirically determined behavior of the prototype as faithfully as possible.

WES from its birth was a pace-setting institution in hydraulics engineering. When European hydraulic prototype conditions failed to match those in the United States - particularly the presence in North America of large, meandering, alluvial rivers with complex beds and basins - WES designed and built new structures on scales unheard of in Europe. In its first year of operation, the Station's Yazoo Basin backwater model was the largest in the world. WES also soon led the engineering world in the use of exaggerated model distortion.

The first of many hydraulic model tests at WES was one of the Illinois River that was carved out of the natural loess soil at WES. The model test in late 1930 had to be perfect the first time. The loess soil would erode after the first test, and it could not be compacted and recarved. The model test turned out to be a complete success. The data gathered in the test was used to establish the backwater limits of the Illinois River. The skepticism that had surrounded the creation of WES was washed away with the first trickle of water through the model. The work at WES shifted into high gear and diversified as more and more models and related work were being researched. A Soils Laboratory was created at WES to study the characteristics of riverbed loads and bank stability. A Geology Branch was established to assist in foundation design problems. These two elements formed the foundation for the present Structures and Geotechnical Laboratories at WES.

The creation of WES and most of its major expansions over the years have been linked with major events and needs in the history of our country. During the Great Depression, a vast program of

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 11

WES Historic District
Warren County, Mississippi

public works construction projects was begun to provide employment. WES assisted this effort with the design of all types of river and harbor improvements, thus extending its work well beyond the limits of the lower Mississippi River valley.

Vogel's tenure as WES Director ended in August 1934 upon his transfer to Command General Staff School. Less than five years had passed since his arrival in Vicksburg at the end of 1929, and less than four since the first WES experiments began in December 1930. Yet he had supervised a remarkable, and largely unanticipated, growth and transition. Carved from an overgrown creek bottom at the outskirts of sleepy Southern river town, the Station by Vogel's departure had become the primary hydraulics research institution not only for the Corps of Engineers, but arguably for the entire nation in some engineering areas. The increasing volume and diversity of work reflected the Station's prominence, rising from thirteen projects in progress in Fiscal Year 1931 to fifty-four in Fiscal Year 1934. Vogel, in a 1934 article for *The Military Engineer*, boasted that WES models "in both number and size surpass those of any similar institution in the world." These served not only the needs of the Mississippi River Commission and Lower Mississippi Valley Division, but were used to perform experiments for districts representing every Corps division in the United States. By 1938 almost 250 different model studies had been completed. This expanded workload started WES on the road to its present nationwide range of activities.

World War II

WES had been almost entirely involved in civil works projects until the early 1940's. As war clouds gathered, the complexion of WES changed to military green as the civil works program was almost abandoned and WES became a war-oriented facility. The staff of WES was greatly affected as 631 employees left to serve in the armed forces. A large number of the model builders from WES were sent to England where they formed the heart of the Engineer Model Maker Department. These former employees used their skills acquired in model testing at WES to build models of many of the sites selected for Allied landings, anticipated battlegrounds, and targets for aerial bombardment such as the Ploesti oil fields and the V-1 and V-2 missile launch pads. The unit received a personal citation and commendation from General Dwight Eisenhower for their outstanding work.

WES also contributed greatly to the success of the Normandy invasion of France with the model testing of the two large portable harbors, called Mulberry harbors, that were designed to handle the offloading of supplies. Each harbor was as big as the port of Dover and consisted of docks, piers, and breakwaters. WES tested the structural design, spacing, stability, and ballast needed for each harbor, which consisted of 150 concrete caissons varying in size up to 6,044 tons. In a major naval operation, 85 tugs made 500 trips to move the harbor components into place. The one under construction in the American landing zone was destroyed by one of the worst channel storms in history before its completion. However, the British Mulberry harbor was used from mid-June until

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 12

WES Historic District
Warren County, Mississippi

November when Antwerp was liberated. Most of the 4.5 million tons of equipment and supplies that were shipped to the Allied forces in France went through the WES tested harbor.

WES also did extensive testing on a wide variety of other military projects including flexible airfield pavements, various military harbor facilities, airfield landing mats, airfield construction criteria, vehicle trafficability in poor soil conditions, and forecasting of river conditions, such as the Rhine, for military crossings.

Post World War II Operations at WES

In 1948 WES expertise was called in to help in a new type of war--the cold war. Russia had cut off all access to Berlin except by air in an effort to force the city under its rule. However, the United States, England, and France were determined not to knuckle under. A decision was made to supply the besieged city by air. The Berlin Airlift was born. However, there were several problems. There were no large paved airfields in the Berlin zone that could handle large transport aircraft. Also the only airfield building material available was rubble from the bombed out buildings of the city. WES engineers provided the needed advice on how to effectively use the rubble as airfield subgrade. The first battle of the cold war was decided on May 17, 1949, when the Russians lifted the blockade. The victory was due in part to the help provided by WES.

Although WES was still under the control of the Mississippi River Commission, it was solving problems and performing research for many Corps of Engineers organizations and other federal agencies. Due to the scope of the work being performed, WES was put under the direct jurisdiction of the Chief of Engineers on August 10, 1949.

Chronological History of Events Associated with the WES Historic District

WES - 1931-1940

January 1931 - First WES organization was formulated, consisting of the Hydraulics, the Sediment, and the Soils Groups.

1931-35 - Model of the Lower Mississippi, designated the "Mississippi Flood Control Model" or the "Helena to Donaldsonville Model" but usually referred to as "Old 9411 (from job number 94), was built. It reproduced 600 miles of the river in 1100 feet; 16,000 square miles had been reduced to an area of less than 2 acres.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 13

WES Historic District
Warren County, Mississippi

1933 - In addition to the newly formed Construction Section in January 1933, three new sections were established in September: Experiment, Research and Publications, and Operations.

1938 - Triaxial test machine was developed by the soils laboratory.

1939 - Soils Division was officially established, even though during the early years a small group of men began to make grain-size analyses of samples of bed load and sediment taken from the Mississippi River. All of the work of the soils laboratory was previously done on a part-time basis.

1939 - Over 100 sets of miniature pontoon bridges were built and sent to military schools and training centers throughout the country. These models were the only way of training engineer groups in the critical task of erecting standard military floating bridges.

WES 1941-1949

1941 - WES resources were "summoned in the race to re-arm America." Up until this time, very few studies concerning defense had been undertaken. One achievement at WES, which proved valuable in wartime, was the development of a pressure-measuring cell to determine pressure within earth dams. The design worked equally well in designing bombproof air raid shelters.

1941 - The first civilian director, Gerald H. Matthes, was assigned to WES.

1941 - WES began developing criteria for the design and construction of airfield pavements.

1942-43 - Pierced steel plate (PSP) landing mat was developed along with several others. Vast quantities of the PSP were used in future years in the Korean and Vietnam wars.

1943 - Flexible Pavement Branch of the Soils Division was established to investigate methods of design and construction of airfield flexible pavements. A \$100,000 grant was made for the establishment of a Flexible Pavement Laboratory.

1943 - Gigantic model of the Mississippi River was built by German prisoners of war at Clinton, Mississippi.

1946 - Concrete Laboratory moves from Mount Vernon, New York, to Clinton. This move consolidated and centralized research facilities within the Corps of Engineers.

1949 - WES is transferred under the direct control of the Chief of Engineers.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 9 Page 14

WES Historic District
Warren County, Mississippi

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United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 9 Page 15

WES Historic District
Warren County, Mississippi

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Interview by Michael C. Robinson of Herbert D. Vogel, Vicksburg, 14-15 June 1984, typed transcript in WES Archives.

Interview by Sue Ellen Hoy of Herbert D. Vogel, Public Works Historical Society for the Historical Division, U.S. Army Corps of Engineers, Washington, D.C., November and December 1976.

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United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 10 Page 16

WES Historic District
Warren County, Mississippi

Geographical Data

The boundary of the WES Historic District is shown as the dashed line on the accompanying map entitled "WES Proposed Historic District."


Boundary Justification

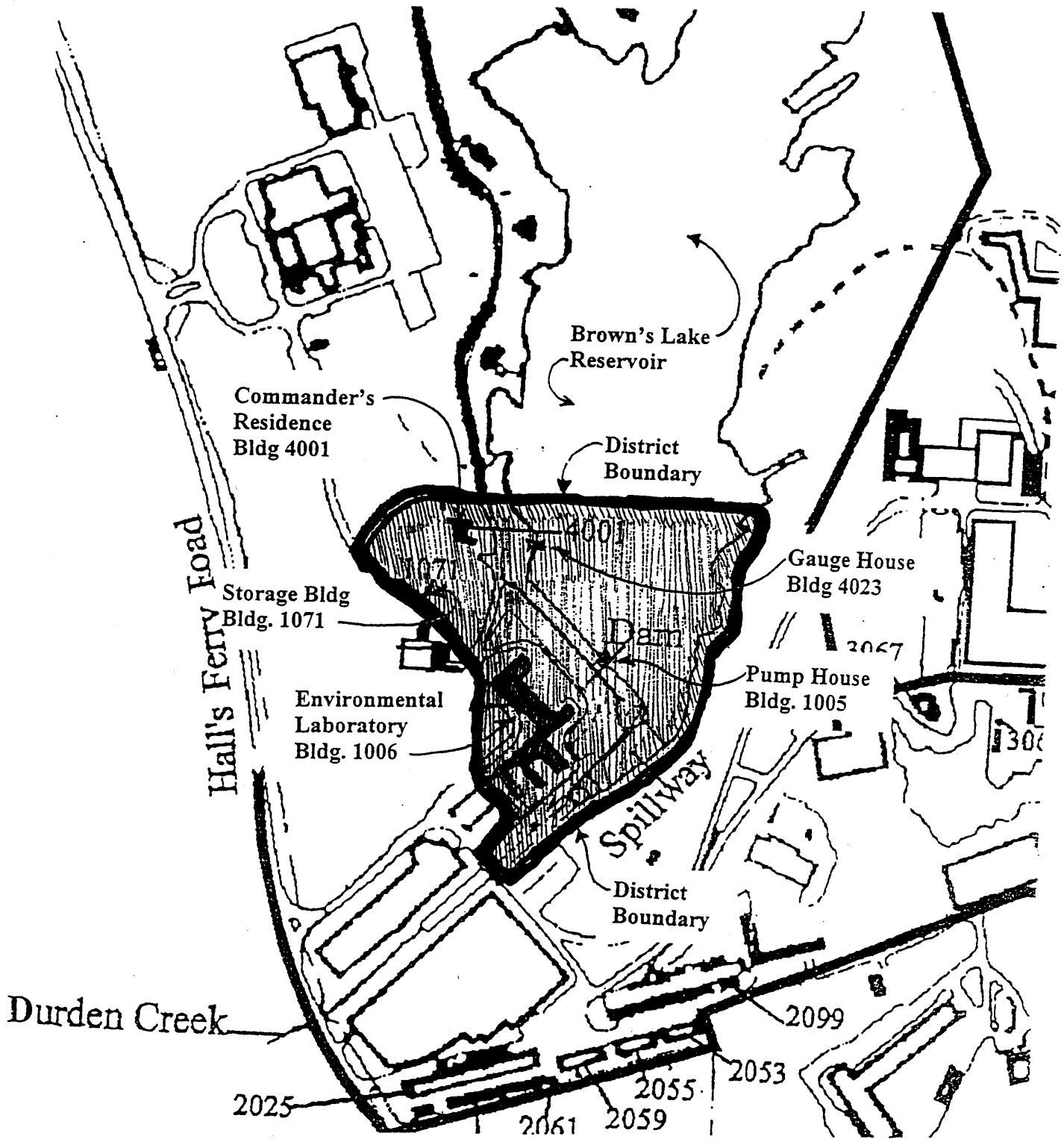
District bounded by Spillway at SE corner, to bridge over Durden Creek at SW corner, to Tennessee Road at West edge until intersection with Arkansas Road at NW corner, to NW corner of Residence No. 1, East across the Experiment Station Lake (Brown's Lake Reservoir), South along high water mark East shore of lake to NE corner of Dam Spillway.

The boundary includes the buildings, dam, lake, spillway, and open spaces that have historically been part of the original WES cantonment and that maintain historic integrity. The proposed boundary encompasses the area where the historic events associated with the early years of WES took place.

WES Proposed Historic District

Scale 1" = 300'

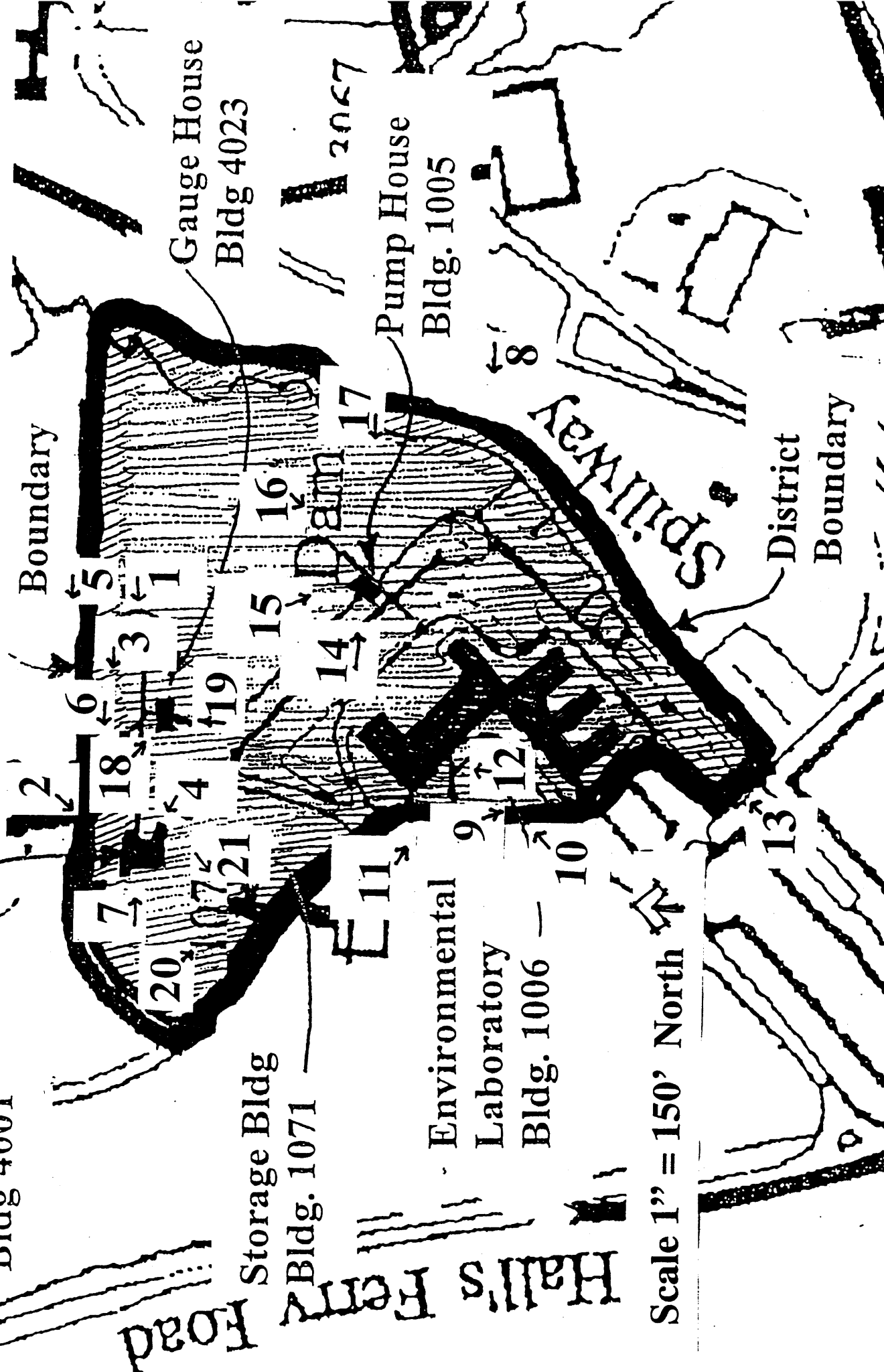
North 



Key to Photographs

WES Proposed Historic District

Commander's
Residence
Bldg 4001



Boundary

Gauge House
Bldg 4023

Pump House
Bldg. 1005

Storage Bldg
Bldg. 1071

Environmental
Laboratory
Bldg. 1006

Scale 1" = 150' North

District
Boundary

Hall's Ferry Road

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 17

WES Historic District
Warren County, Mississippi

Additional Documentation

USGS Geographical Map

Sketch Map Indicating Boundary

Sketch Map Indicating Location Of Photographs

Photographs

Recent Photographs of District, Identification label information

Photo 1:

Photographer—Ezra Abraham,

Date of Photograph 23 August 1999.

Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.

View looking west to main façade of Residence No. 1, also shows garage entry.

Photo 2:

Photographer—Ezra Abraham,

Date of Photograph 23 August 1999.

Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.

View looking southwest to main façade of Residence No. 1, shows addition to original structure.

Photo 3:

Photographer—Ezra Abraham,

Date of Photograph 23 August 1999.

Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.

View looking southwest to main façade of Residence No. 1, shows main entry court.

Photo 4

Photographer—Ezra Abraham,

Date of Photograph 23 August 1999.

Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.

View looking south. Close up view of corner detail.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 19

WES Historic District
Warren County, Mississippi

Photo 11:

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking northwest Environmental Lab.

Photo 12

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking north to Environmental Lab main façade.

Photo 13

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking northeast to spillway in foreground with dam and Brown's Lake in background.

Photo 14

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking east to Pump House on dam in foreground, with Brown's Lake in background.

Photo 15

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
Interior view of Pump House showing roof structure.

Photo 16:

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
Interior view of Pump House showing construction details.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 20

WES Historic District
Warren County, Mississippi

Photo 17

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
Interior view of Pump house showing equipment details.

Photo 18

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking east to Gauge House in foreground, with earthen dam and Brown's Lake in background.

Photo 19

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking north to Gauge House in foreground, with Brown's Lake in background.

Photo 20:

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking southwest to Storage Building east and south facades.

Photo 21

Photographer—Ezra Abraham,
Date of Photograph 23 August 1999.
Original negative at Seattle District Corps of Engineers, CX-HP, Seattle, WA 98124.
View looking east to Storage Building west and north facades.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 21

WES Historic District
Warren County, Mississippi

Historic Photographs of District, Identification label information

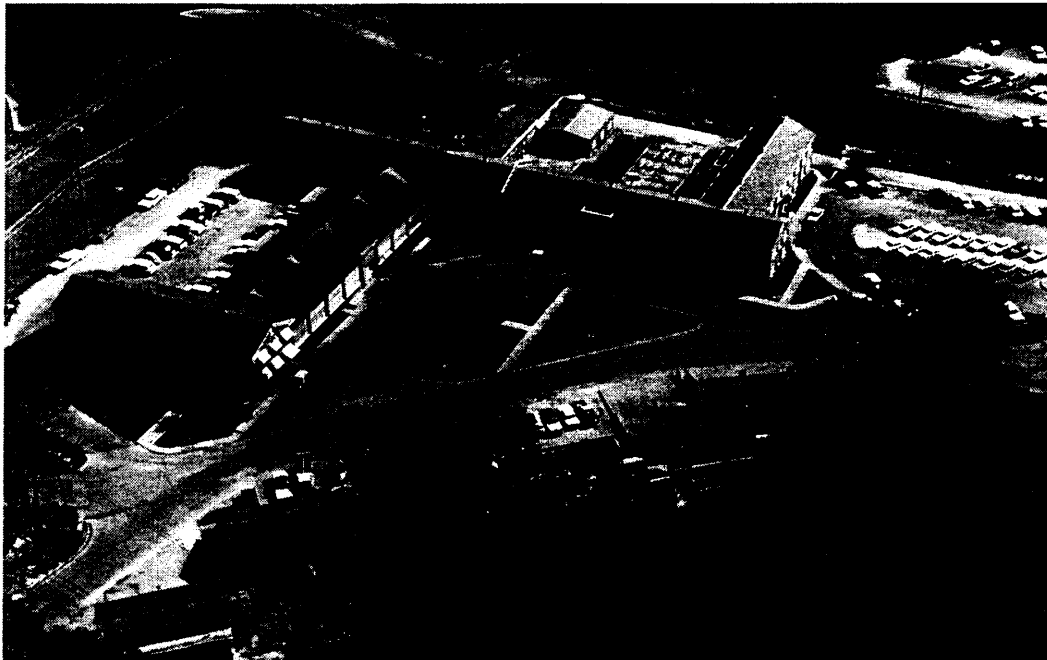


Photo A: Photographer: Unknown, Date of Photograph: Unknown. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. View looking northeast with original headquarters building in foreground.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 22

WES Historic District
Warren County, Mississippi



Photo B: Photographer: Unknown, Date of Photograph: Circa September 1930. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. View looking southwest with original headquarters building in foreground during final construction.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 23

WES Historic District
Warren County, Mississippi



Photo C: Photographer: Unknown, Date of Photograph: Circa Spring 1930. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. View looking southwest with original headquarters building in foreground during construction.

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 24

WES Historic District
Warren County, Mississippi

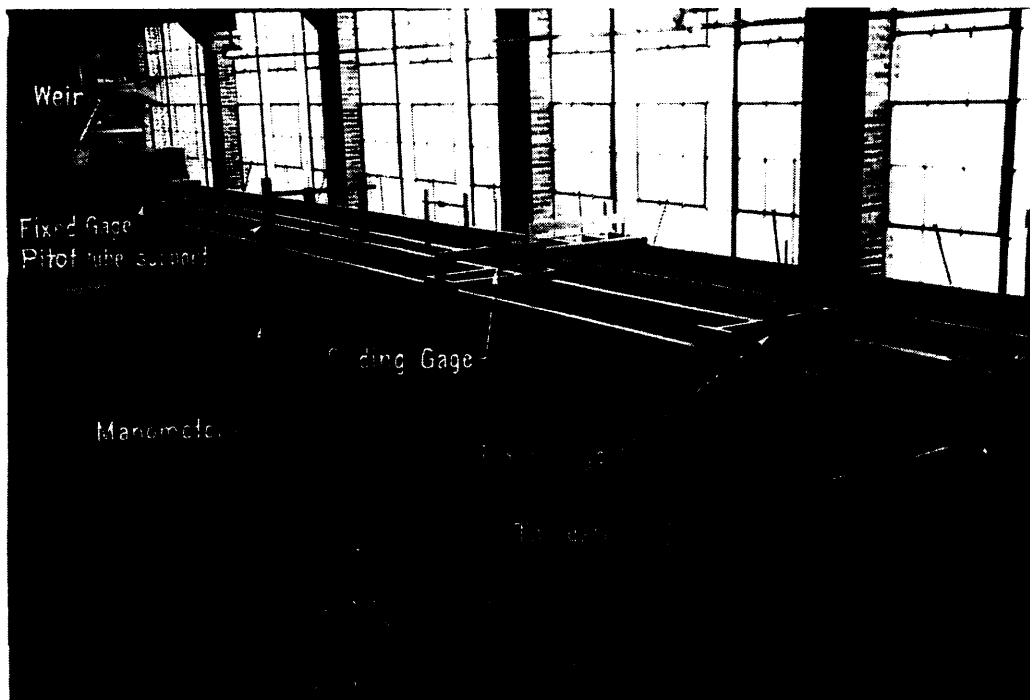


Photo D: Photographer: Unknown, Date of Photograph: Circa early 1930's. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. Interior view of hydraulic lab in original headquarters building.

United States Department of the Interior
National Park Service

**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Section 11 Page 25

WES Historic District
Warren County, Mississippi

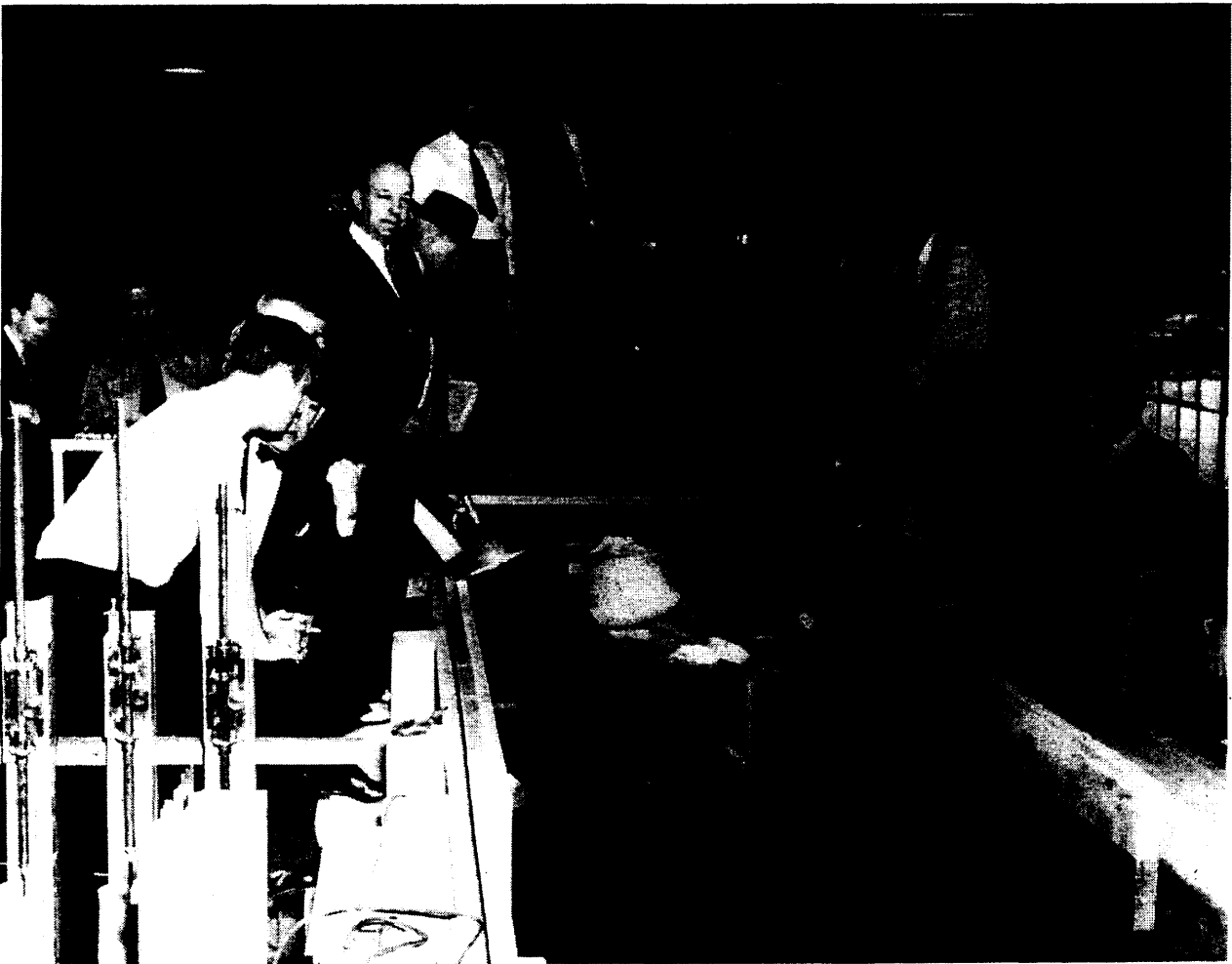


Photo E: Photographer: Unknown, Date of Photograph: Circa 1930's. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. Interior view of hydraulic lab in original headquarters building. Researchers demonstrating hydraulic experiment.

United States Department of the Interior
National Park Service

**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Section 11 Page 26

WES Historic District
Warren County, Mississippi



Photo F: Photographer: Unknown, Date of Photograph: November 6, 1939. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. Aerial view looking to southeast, showing Brown's Lake, dam, spillway, and main laboratory building in background.

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National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 11 Page 27

WES Historic District
Warren County, Mississippi

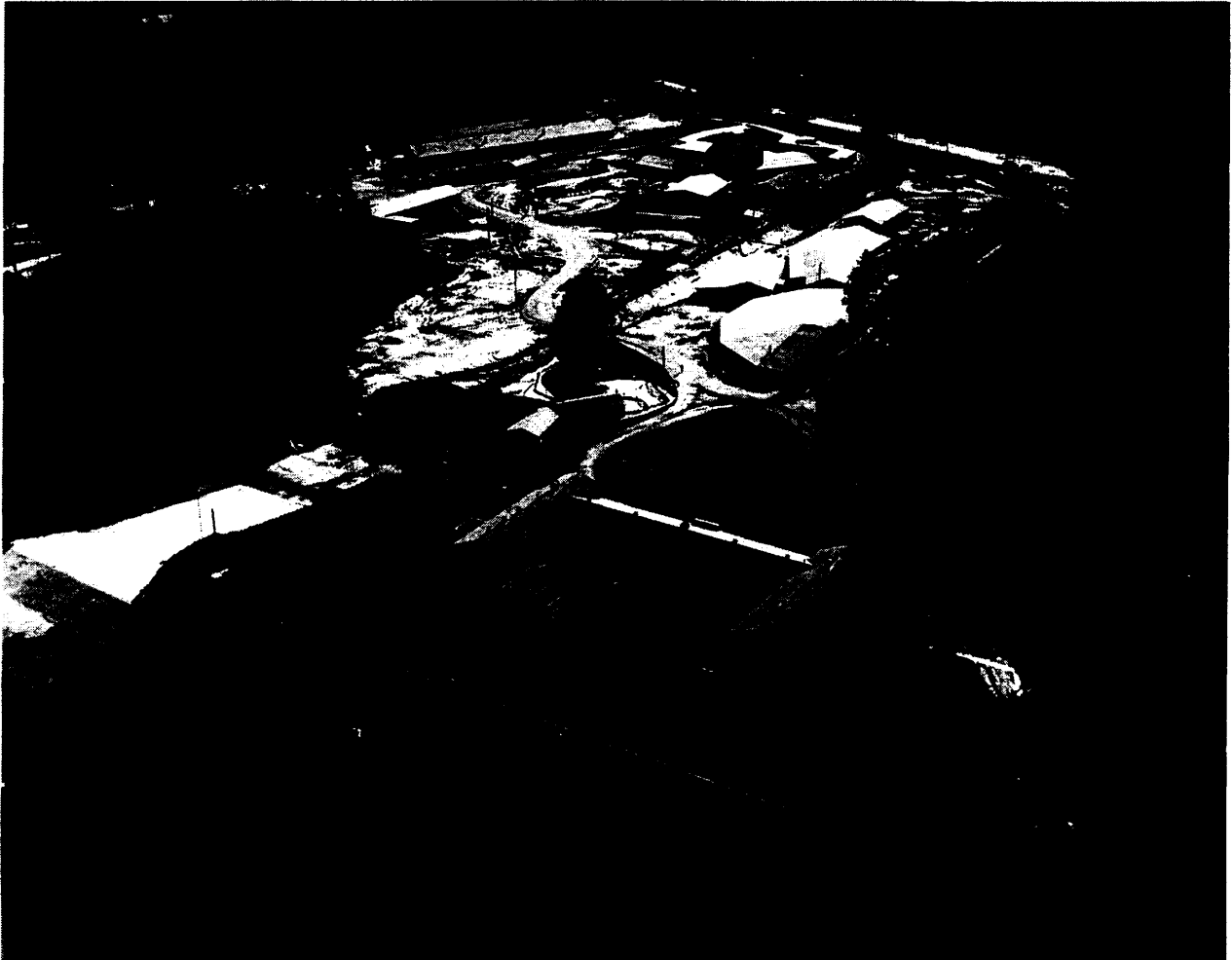


Photo G: Photographer: Unknown, Date of Photograph: Early 1940's. Original historic print at Waterways Experiment Station (WES), U.S. Army Corps of Engineers, Vicksburg, MS. Aerial view looking to southwest, showing dam, spillway, and main laboratory building at lower right of photograph. In the background are temporary structures used to house hydraulic models.