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CONSTRUCTION

CLINTON ENGINEER WORKS

U. S. CONTRACT NO. W 7412 ENG.-23

DU PONT PROJECTS 9733 & 58

HISTORY OF PROJECT

START January 25, 1943

COMPLETE April 1, 1944

Classification Cancelled/Changed

TO

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E. I. du Pont de Nemours & Company, Inc.

War Construction Division

Nemours Building

Wilmington, Delaware

April 1, 1944

MASTER

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I INTRODUCTION

The site for Clinton Engineer Works is located in the northeast part of Roane and the southwest part of Anderson Counties, Tennessee, and lies north of the Clinch River. This Project was unofficially announced November 6, 1942, in the Knoxville News-Sentinel newspaper. The date this Project, as a whole, was initiated is not available for this report.

At the time of procurement, this tract was to be called "Kingston Training Site" but was changed to "Kingston Demolition Range", and now is known as "Clinton Engineer Works".

The Tennessee Area Office of the Manhattan District, United States Engineer Office, was opened November 5, 1942, at 931 North Central Avenue, Knoxville, Tennessee, under Commanding Officer Major Warren George, Area Engineer, for the construction of Clinton Engineer Works. Captain J. F. Grafton, Assistant to the Area Engineer, was assigned to the construction of the TX Area on December 9, 1942.

Prior to du Pont's active participation in the field, Stone and Webster Engineering Corporation was engaged in construction of Administration, Dormitory, and Y-12 Areas on the same reservation with Skidmore, Owings & Merrill, Architect and Engineer for the Town Site Area. During the construction period, other prime contracts were awarded to J. A. Jones Construction Co., Ford, Bacon and Davis, Inc., William A. Pope Company, Combustion Engineering Company, and Schukman Electric Company for the construction of the K-25 Area, with E. R. Kellogg Company as design engineers for K-25 Area. The prime contract held by the J. A. Jones Construction Company also included the construction of several Oak Ridge Housing Units.

Work was authorized by Supplement No. 1 dated January 4, 1943, to Letter Contract W-7412 Eng-1 dated December 1, 1942, and was covered by a definitive cost plus a \$1.00 fee contract numbered W-7412 Eng-23. Negotiations were between the Explosives Department of the E. I. du Pont de Nemours and Company (Inc.) and the Contracting Officer of the Manhattan District of the Corps of Engineers for the construction of X-10 Area at Clinton Engineer Works, now known as TX Area (for the manufacture of a secret product), consisting of two Process Areas, two Service Areas, General Facilities and Outside Lines. The definitive contract was approved February 15, 1944, for the Government by the Under Secretary of War.

Preliminary design was started January 15, 1943, by the Wilmington Office and actual construction work began in the field February 1, 1943, under the direct supervision of a Field Project Manager, and known as Project 9733.

Work also included experimental construction covered by Project 58. The work performed under Project 58 was directly connected with the Hanford Engineer Works, a Manhattan District Project located at Pasco, Washington, for which du Pont was also Prime Contractor.

The type and nature of construction for Projects 9733 and 58 was classified by the government as "TOPSECRET" and, in order to guard against leakage of information pertaining to construction of this job, it became necessary to take additional precautions which had not been required by previous unclassified government contracts. A special office, under supervision of a security agent, was set up by du Pont to comply with government regulations set forth in Prime Contract.

Rigid observance of the following precautions was compulsory for all personnel connected in any manner with construction of Projects 9733 and 58. All employees on these projects, at first, were required to produce birth certificates proving United States Citizenship. Plant visitors were held to a minimum and the movement of personnel within the plant was controlled to the extent that only authorized personnel were permitted to work in, or enter, the 100 and 200 restricted Areas. Selection of restricted area personnel was made from a review of the personnel folder for each employee considered. Rejections were based on unfavorable background or character, upon review of personnel folder, and results of further investigation by the Federal Bureau of Investigation.

An authorization card system was adopted and limited to key personnel in order for them to converse with necessary crafts to perform their duties and assist with construction of restricted buildings.

Classified drawings for process areas were placed in a classified file, and only supervisors and personnel with proper authorization cards were permitted to view and use these drawings.

The plant site for TNX Area was selected by the Government after careful study and preliminary investigations. This location affords an adequate supply of water as well as an abundant supply of cheap electric power. The area surrounding Knoxville was declared by the War Manpower Commission to have a labor surplus. Only a small portion of the land was suitable for cultivation, as the top layer of soil was poor and was used mostly for grazing. The terrain afforded natural drainage and surrounding ridges provided adequate protection for this type of Plant.

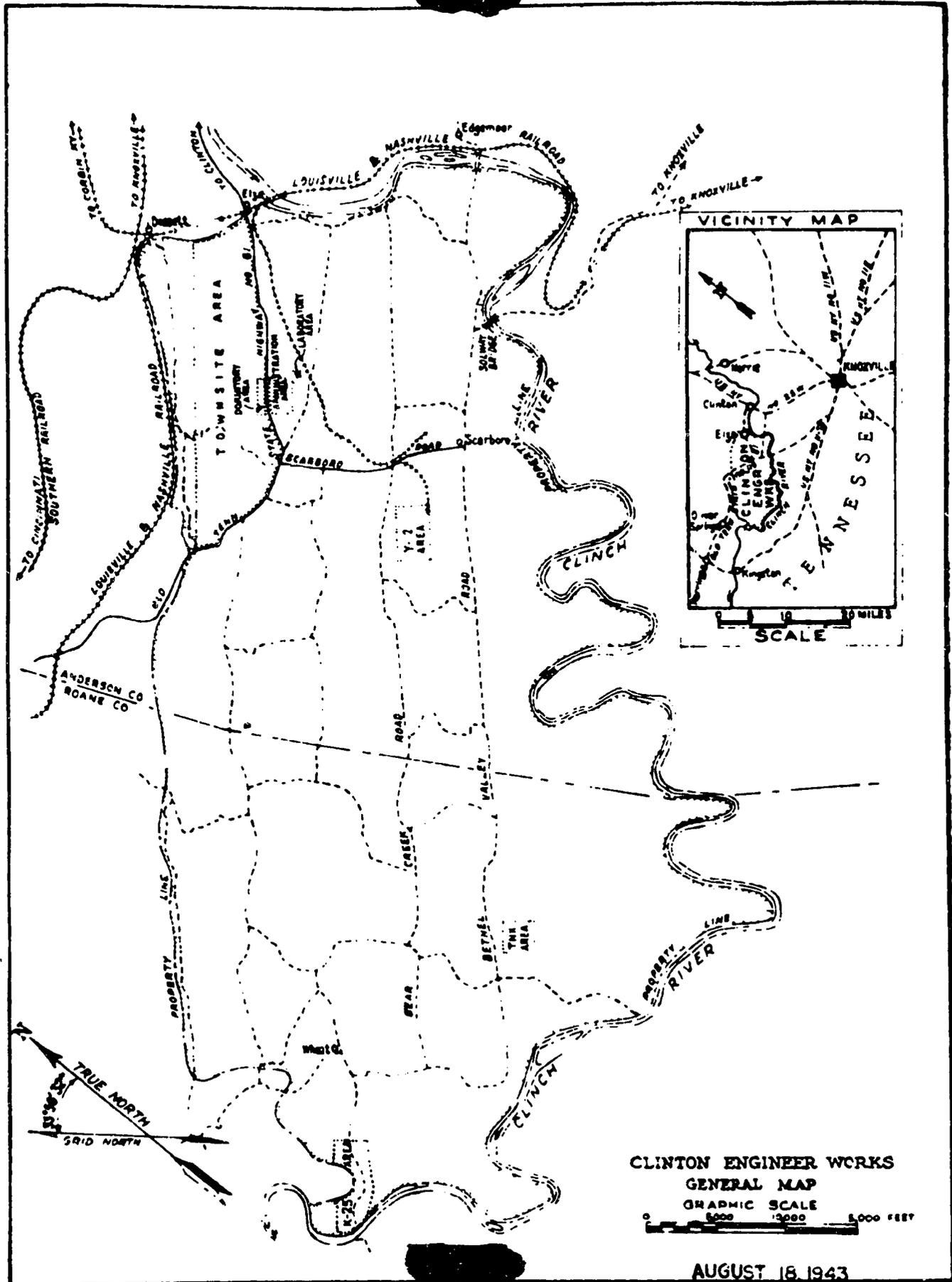
II LAND ACQUISITION

A land acquisition office was opened at Harriman, Tennessee, on September 28, 1942, under the supervision of P. Morgan, Project Manager, Ohio River Division, United States Engineering Department, and represented the government in the procurement of all land required for the project site. The site is located in the northeast part of Roane and southwest part of Anderson Counties, lies north of the Clinch River, and consists of 58,200 acres with a government evaluation of \$2,058,000, or approximately \$35.50 per acre, including improvements. The terrain in which the Clinton Engineer Works site is located consists of pronounced parallel wooded ridges running in a northeasterly direction, and with water courses flowing southwesterly in the intervening cultivated valleys between the ridges. A plat entitled "Clinton Engineer Works, General Map", is included in this report on page 4. This plat shows the property which was obtained and the relative location of the project site to the cities of Kingsport, Norris, Clinton, Oliver Springs, and Kingston.

The site was made up of 758 individual tracts of land. The government acquired all property by condemnation under the War Relocation Powers Act. A suit was filed in the Federal Court at Knoxville, Tennessee, condemning the land on October 6, 1942. Court notices were served upon the property owners by the U. S. Marshall. In the construction areas, vacating of the property was required within stated intervals of time, this period varying from 20 to 30 days. All the property was acquired by condemnation proceedings in order to expedite its acquisition and not, in general, because of lack of agreement between the principals. The local newspapers of the vicinity carried full publicity as to the property being taken over. The government imported appraisers because they were unable to obtain such qualified individuals locally. The appraisers were selected by the War Department.

Among the tracts of land taken over were included a number of historical sites and cemeteries. All cemeteries lying outside of construction areas were undisturbed. Whenever it was found that there were cemeteries, the following procedure was used. The government contacted the trustees of these cemeteries, and appraisers were selected by them. After the new location had been selected by the trustees, the government arranged for the services of morticians for disinterring and reburial of the remains.

The TNX Area, consisting of four parcels of land owned by the following parties: E. E. Hagler, O. F. Hagler, J. D. Anderson, Joshua and Phoebe Monger, and containing approximately 112 acres, is located in the northeast part of Roane County, Second Civil District, lying in Bethel Valley between Haw and Chestnut Ridges and approximately one mile southwest of the New Bethel Church on



**CLINTON ENGINEER WORKS
GENERAL MAP**

GRAPHIC SCALE
0 5000 10000 15000 FEET

AUGUST 18, 1943

Bethel Valley Road, now identified as Road "C" which runs along the northwest boundary line of the tract. The Area is approximately 28 miles from Knoxville, 35 miles from Harrison, 10 miles from Clinton, 15 miles from Synington by road, and 12 miles from Lenoir City by the way of White Pine Ferry Road. Synington was consignment point for rail shipments for this Area.

The corner coordinates of the TMA Area are as follows:
 N 21279.5 - E 21080.0; N 21280.0 - E 21080.0; N 21080.0 - E 21560.0; N 21080.0 - E 29890.0; N 22150.0 - E 29890.0;
 N 22150.0 - E 29775.0; N 22154.0 - E 29775.0; N 22283.0 - E 20650.0. These coordinates are based upon the system set up by the government for the Clinton Engineer Works Project. The north and south coordinate had a bearing of N 330 58' 38" W. The enclosed area lies on a south slope of Chestnut Ridge, and is bounded on the north by Road "C", east and west by well defined draws, and on the south by White Oak Creek, which flows in a westerly direction. One wooded section located in the northeast corner of the plant site had to be cleared in order to erect an enclosure fence. Constant flowing springs were found in the western part of the Area.

Prior to construction, two residences and two barns were situated on the site. A county road (C-305) traversed the Area, running in a southerly direction from the Bethel Valley Road (Road "C") to the Clinch River, where it crossed same. An unnamed cemetery owned by Joshua and Phoebe Menger was located on the Area. This cemetery, consisting of forty-two graves, was moved off of the Clinton Engineer Works Reservation to the Borum Cemetery located in Roane County approximately three miles south of Oliver Springs, Tennessee. This work was performed by Clyde Cox, mortician of Lake City, Tennessee, under the supervision of the government.

The top soil is a clay gravel with the gravel ranging in size from one-fourth inch to two inches. Beneath this layer of clay gravel is a stratum of disintegrated slate approximately twelve inches thick. Immediately below the slate is a stratum of limestone. This rock layer is inclined at an angle of 30° to 45°, and runs in a north to south direction.

The following is a copy of driller's log taken from Drinking Water Well Building 811:

2 1/4" Hole

<u>Strata</u>	<u>Depth</u>	<u>Elevation</u>
Grade		324.2'
Clay (Boulders)	19'	305.0'
Limestone	21'	303.0'
Grey Limestone	200'	624.0'
Grey Limestone	38'	444.0'
Red "Shaley" (Limestone)	390'	424.0'
"Red Rock" (Limestone)	600'	224.0'
Bottom of Well	600'	224.0'

The red limestone, commonly known as driller's "Red Rock" contained joints and fractures into which the drill sometimes penetrated as much as six inches. W. C. Honeyaker, Tennessee Valley Authority geologist, identified the limestone as Chickamauga Formation (usually dolomitic), and stated that it is found in various colors.

The elevation of the ground within the du Pont site varies from 898 feet to 774 feet above mean sea level, datum based on United States Coastal and Geographical Survey, United States Geodetic Survey, and Tennessee Valley Authority Surveys.

The site of the River Pump House and the White Oak Creek Dam was not included in the enclosed TRS Area, as shown on page 7, Bethel Valley Quadrangle Sheet. This would have required extensive fencing and additional plant patrol in order to provide sufficient protection. The River Pump House was finally located in the vicinity of the confluence of Walker Branch and the Clinch River, which is just upstream from what is known as Walker Bend of the Clinch River, and approximately six miles upstream from the upper pool stage of the Watts Bar Dam and in the lower southwest corner of Anderson County. The coordinate location is approximately N 18828 - E 47174. The White Oak Creek Dam site was located where White King Ferry Road crosses White Oak Creek, and is now identified as Road AF-250, approximately one mile north of the ferry crossing the Clinch River. The lake impounded by this area contains approximately twenty-five acres.

UNITED STATES
PARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
TENNESSEE VALLEY AUTHORITY
MAP AND PHOTO DIVISION
(WINDING TUNNEL)

THREE VALLEY QUADRANGLE



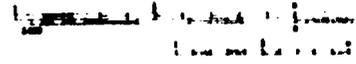


Map by HIGGINS, UDDY, and TVA
 compiled by Geological Survey from aerial
 photographs by stereophotogrammetric methods
 completed by Tennessee Valley Authority, 1941

Compiled by the Geological Survey

--- Approximate outline of Watts Bar Reservoir

APPROXIMATE MEAN
 ELEVATION, 1941



(Lower 1/4 120-5A)

Scale 24000

Contour Interval 30 feet
 Datum to mean sea level

1 Mile
 1600 Feet

1 Kilometer

U.S. GEOLOGICAL SURVEY
 WASHINGTON, D. C.
 1941

RUFFEL VALLEY TENN

III THE PLANT

The E. I. du Pont de Nemours & Company, Inc., was awarded a Prime Contract as Architect - Engineer - Manager for the construction of a Pilot Plant, known as the TNX Area at Clinton Engineer Works.

The scope of the work included in the Prime Contract W 7412 Eng.-23 consisted of the construction of seven areas; namely, 100 Area, 5 Process Buildings; 200 Area, 3 Process Buildings; 300 Area, 1 Process Building; 500 Area, Outside Electric Lines; 600 Area, 15 General Facilities and Outside Lines; 700 Service Area No. 1, 27 Administration and Service Buildings and Facilities; and 800 Service Area No. 2, 9 buildings for water supply, storage and treatment, and steam generation as shown on the Plot Plan for TNX Area marked as shown on page 9.

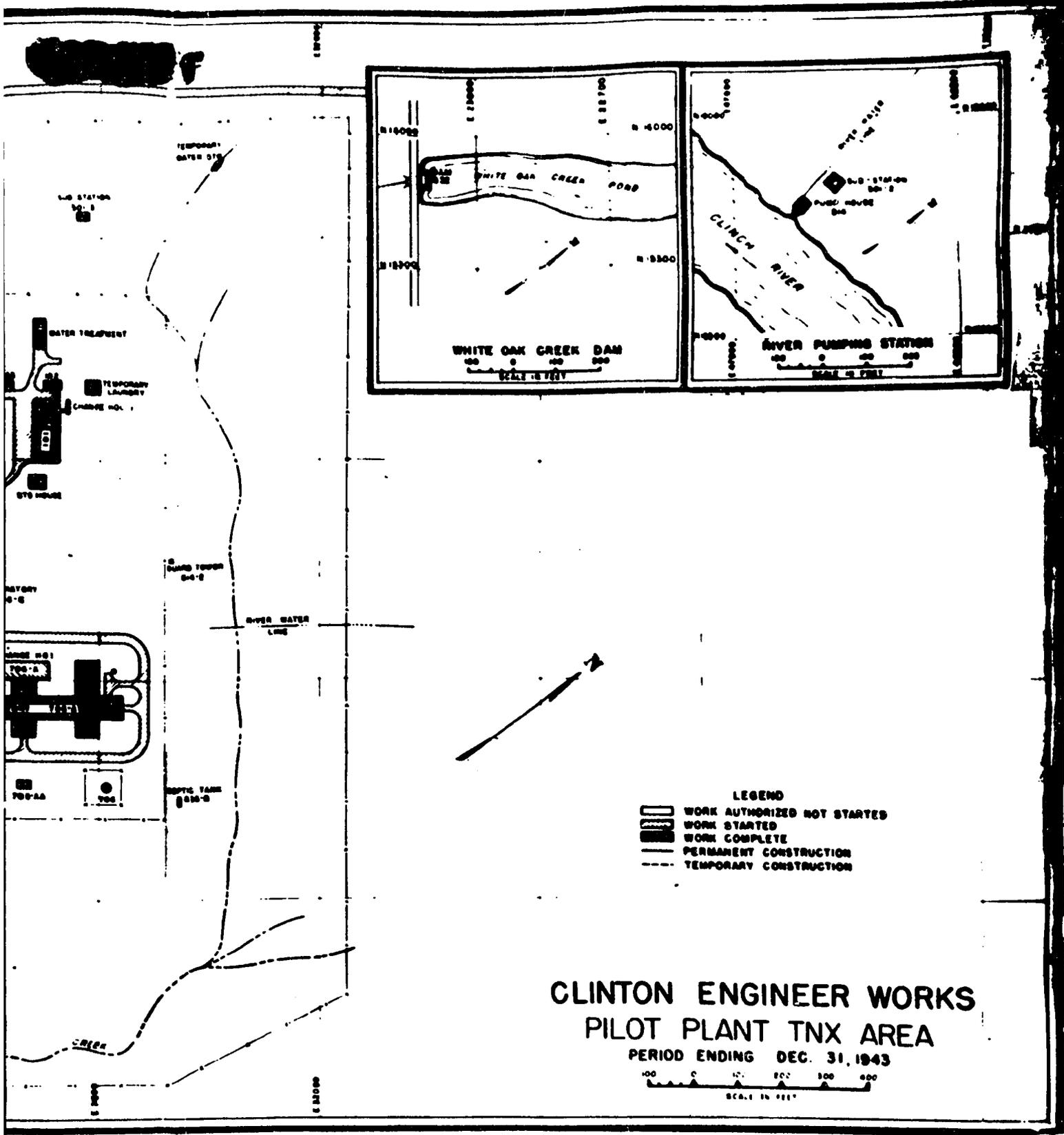
All of the areas, buildings, and facilities listed above are for Project 9733 with the exception of 300 Area, which is Project 58.

Major William L. Sapper, Area Engineer, Wilmington Office, verbally authorized du Pont and later confirmed by letter on May 17, 1943, to charge the cost of constructing the experimental work covered by Project 58, under Contract No. W 7412 Eng.-23, to Clinton Engineer Works' account. The definitive contract includes the estimated cost of both projects as the cost of "The Plant".

The 100 and 200 Process Areas are confined to the northeast portion of the TNX Area as shown on Plot Plan, and were surrounded by a second enclosure fence which further restricted the movement of personnel within the plant. The 100 Area consists of two main process buildings, the 105 Pile Building, and 115 Exhauster Building, which are interconnected by an underground concrete fan suction duct for the disposal of toxic fumes from the 105 Building.

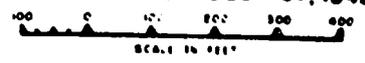
The 200 Area consists mainly of the 206 Tank Farm and the 205 Separation Building, the latter of which is connected by an underground pipe and walkway with the 105 Building. The 100 and 200 Area main process buildings, as mentioned above, are supported by the following buildings which are located in the immediate vicinity: 102 Instrument Storage Building, 103 Storage Vault, 104 Area Laboratory, 807 Water Treatment House, 707C Change House, 714 Storage Platform, and 737 Rain Shelter.

The 101 Building and five temporary buildings; namely, two storage sheds, laundry, construction office and change house, were used throughout the construction period for fabrication of carbon blocks which were assembled in the 105 Pile Building. The temporary buildings were dismantled or moved when this work was completed. Building 105-E, consisting of furnace house and two storage sheds, were also temporarily constructed in order to test



**CLINTON ENGINEER WORKS
PILOT PLANT TNX AREA**

PERIOD ENDING DEC. 31, 1943



- LEGEND**
- WORK AUTHORIZED NOT STARTED
 - WORK STARTED
 - WORK COMPLETE
 - PERMANENT CONSTRUCTION
 - TEMPORARY CONSTRUCTION

special material for the 105 Pile Building. Upon issuance of a Field Change Request by Clinton Laboratories, the Carburizer Building, Metal Storage Building, and Cylinder Storage Building were not dismantled. The 607 Building, or so-called Water Treatment House in this area, provides demineralized water, carbon, and peroxide for the 105 and 205 Buildings. Separate concrete exhaust stacks for the removal of fumes and vapors were provided for 115 and 205 Buildings.

The 300 Area, known as Project 53, consisted of only one building, 305 Experimental Building, and was centrally located due east of the Boiler House, building 301, and on the north side of the main East and West Plant Road. The necessary facilities required in connection with this building, such as electric power, lights, water, steam, sewers, and air, were obtained from Project 9735. As previously mentioned, this area had no direct connection with Project 9733, but was merely an experimental station for the Hanford Engineer Works; and, upon completion of experimental work the equipment was dismantled and the building structure was turned over to Clinton Laboratories for use as an area shop.

The 500 Area consists of Outside Electric Power Lines and four sub-stations, three of which are within the THX Area and the fourth is located at the River Pump Station. The power for this system is purchased from the Tennessee Valley Authority and is supplied by their local system, which has for its immediate feeders Norris and Watts Bar Dam hydro-electric plants.

The 600 Area consists of fifteen general facilities, overhead and underground lines; namely, 603 Roads and Walks; 604 Truck Scale, Cranes, Trucks and Equipment; 605 Fences; 612 Open Drainage Ditches; 613 Permanent Parking Lot; 614 Five Guard Towers; 615 Outside and Inner Fence Lighting; 622 Overhead Steam Lines; 623 Underground Water Lines, including 16" water line from River Pump Station; 624 Air Lines; 625 Two Septic Tanks, Sanitary and Process Sewers; 628 Process Lines, Underground and Overhead; 630 Underground Fire Protection System; 631 Outside Overhead Line Supports; and 632 White Oak Creek Dam.

The 700 Service Area No. 1 is mainly confined to the north-western portion of the THX Area and is comprised of twenty-five service facilities, seven of which are directly connected with the Process Area and the balance serve as the administrative buildings. The buildings connected with the Process Area are 706-A, 706-B, and 706-C Process Laboratories supported by 706-AA Oil Storehouse, 706-AP Oxygen Manifold House and 726 Propane Gas Storage Tanks and Lines, and 714 Storage Platform.

The buildings serving the administration group are as follows: 701A and 701-B Gate Houses, one of which is combination of Clock Alley and Laboratory; 702 Telephone and Fire Alarm Systems, 703-A Main Administration Building; 707-A, 707-B, 707-AB, and

707-C Four Change Houses; 708 Cafeteria; 713 General Storehouse; 715 Flag Pole; 717-A Shop and Supply Storage Building, and 717-B Special Machine Shop; 719 First Aid Building; 720 Patrol Headquarters and Fire Station; 723 Laundry; 724 Gas Station; 725 Auto Service Station; 735 Training Building; and 737 Rain Shelter.

The 800 Service Area No. 2 is centrally located in the TNX Area, with the exception of the River Pump Station, and is composed of eight buildings and one facility; namely, purchased power. The buildings are used as follows: 801 Boiler House, 802 Reservoir, 803 Purchased Power, 807 Water Treatment House, 811 Drinking Water Well Building, 812 Reservoir Pump House, 813 Filter Plant, 814 River Pump House, and 815 Elevated Water Storage Tank.

The availability of facilities based upon design are as follows: Raw Water - 1800 gpm, Filtered Water, 400 gpm average - 1000 gpm peak, Steam - 38,000 lb. per hr., Electric Power - 2500 kva., Sewerage Treatment - 16 gpm, Compressed Air - 230 cfm, Propane Gas - 5 cfm, Demineralized Water - 80 gpm.

The following quantities of available facilities are required for 100% operation: Raw Water - 900 gpm, Filtered Water - 200 gpm, Steam - 9500 lb. per hr. Summer, 25,000 lb. per hr. Winter, Electric Power - 1775 kva, Sewerage - 16 gpm, Compressed Air - 275 cfm, Demineralized Water 40 gpm average 80 gpm peak, the full requirements for Propane Gas is not known at this time.

The type of construction used for this plant was semi-permanent and, as previously mentioned, was to be used as a Pilot Plant for experimental purposes relative to the construction of other Plants by the United States Government.

The nature of this work, end product, quantities, etc., were not available for this history. However, this work was carried on by an organization, known as Clinton Laboratories, who began initial occupation of Administration Building on July 22, 1943. The 101, 102, 103, 105, and 115 Process Buildings were turned over to Clinton Laboratories on October 16, 1943, for test operations; however, the initial start-up of 105 and 115 Buildings was not made until 2:30 P.M., November 3, 1943. During this lapse of time, corrections were made for both loading and unloading mechanisms as well as to correct other minor defects. The maintenance of all Process Buildings was assumed by Clinton Laboratories prior to start-up. It was also mandatory that these buildings be accepted by the Area Engineer for construction completion, or with exceptions, prior to the initial start-up.

During the course of construction, Clinton Laboratories, operators of TNX Area, requested the du Pont Company, through the Design Division, to construct additional buildings for this project, as well as to increase sizes of existing structures and to make necessary design changes to process equipment and

buildings. In compliance with these requests, revisions were made to original drawings, and additions were made to the original contract. Others were covered by Field Change Requests and Plant Work Orders. These will be discussed in detail under "Part 11, CONSTRUCTION".

IV CONSTRUCTION ORGANIZATION

A Engineering Department

The Engineering Offices of the E. I. du Pont de Nemours & Company, with the exception of the offices of the Field Project Managers for the War and General Construction Projects as listed on the current copy of the Engineering Department Organization Chart dated June 1, 1943, are located in the Du Pont and Nemours Office Buildings in Wilmington, Delaware.

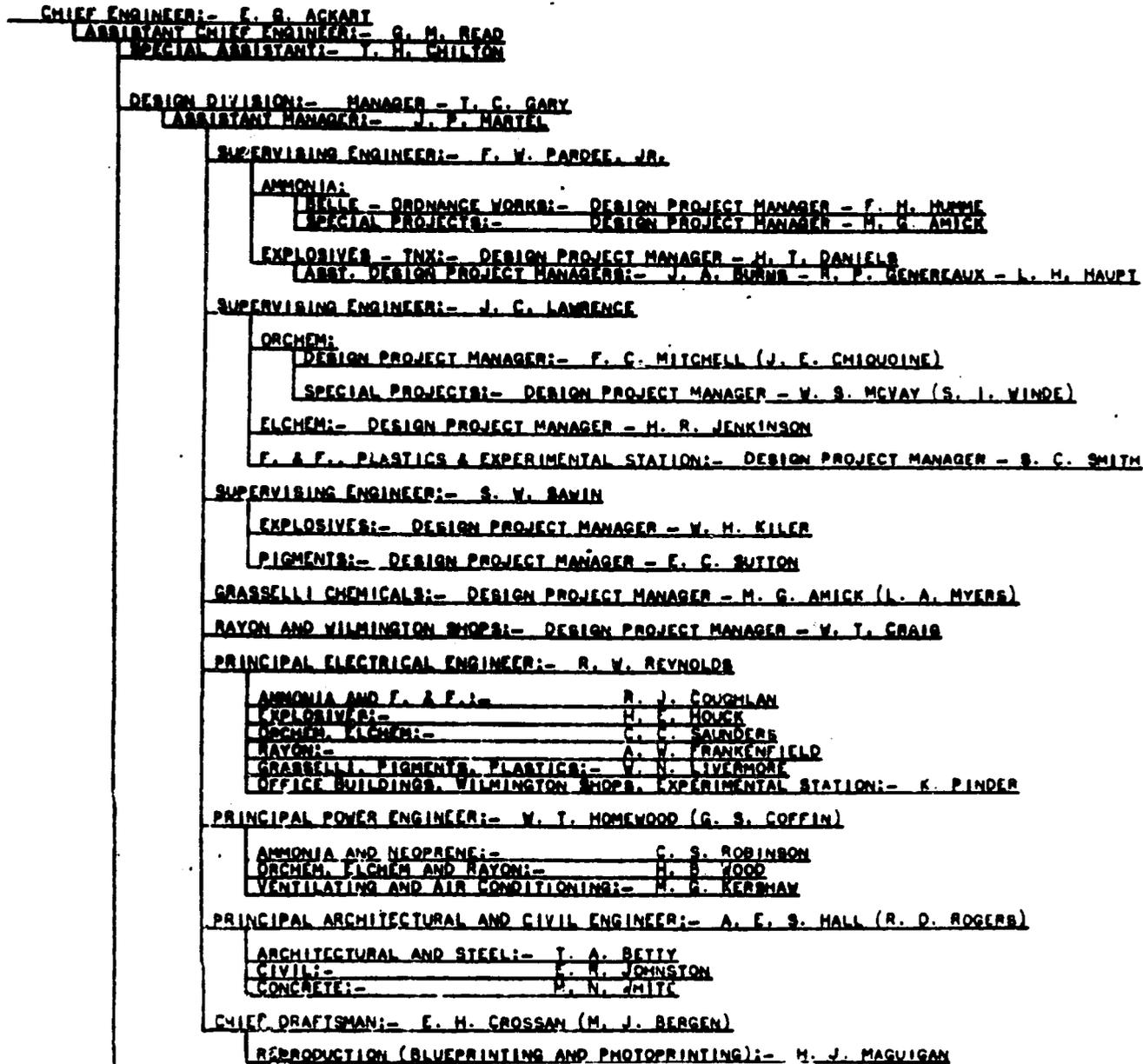
According to the current Engineering Department Organization Chart, du Pont's portion of the War Construction Program for the United States Government, as well as the Commercial Research and General Construction Program of the E. I. du Pont de Nemours & Company and Subsidiaries, are under the direction of a Chief Engineer and Assistant Chief Engineer.

The different phases and responsibilities for this work have been divided into eight divisions; namely, Design, Construction, Industrial Engineering, Technical, Control, Wilmington Shops, Consulting, and Estimating.

JUNE 1, 1943

ORGANIZATION CHART

ENGINEERING DEPARTMENT - E. I. DU PONT DE NEMOURS & COMPANY



CHIEF DRAFTSMAN:- E. M. CROSSAN (M. J. BERGEN)

REPRODUCTION (BLUEPRINTING AND PHOTOPRINTING):- M. J. MAGUIRAN

CONSTRUCTION DIVISION:- GENERAL MANAGER - M. F. WOOD

GENERAL CONSTRUCTION:- MANAGER - G. R. AMES

DIVISION SUPERINTENDENT:

DISTRICT SUPERINTENDENT:- J. P. DIEM (R. D. WILSON)

MARSHALL PLANT:- FIELD PROJECT MANAGER - H. D. BOYCE

NIAGARA PLANT:- FIELD PROJECT MANAGER - R. F. STEWART (G. I. SAYLOR)

BUFFALO:- FIELD PROJECT MANAGER - V. O. COTTY

LEOMINSTER:- FIELD PROJECT MANAGER - J. B. DIVEN, JR.

DISTRICT SUPERINTENDENT:- B. B. LEWIS

DYE WORKS:- FIELD PROJECT MANAGER - S. KREWATCH (W. C. WEAVER)

BELLE:- FIELD PROJECT MANAGER - R. C. REBER

RAYON ROBE:- CONSTRUCTION ENGINEER - H. J. MILLER

LOUISVILLE:- FIELD PROJECT MANAGER - J. B. SMITH (F. J. MARTIN)

DISTRICT SUPERINTENDENT:- S. REEVES (J. A. CROWLEY)

SEAFORD:- FIELD PROJECT MANAGER - H. R. FOLSOM, JR.

SPRINGERS:- FIELD PROJECT MANAGER - R. L. TIGHE

WAR CONSTRUCTION:- MANAGER - F. M. MACKIE

DIVISION SUPERINTENDENT:

MANFORD ENGINEER WORKS:- FIELD PROJECT MANAGER - G. P. CHURCH (T. L. PIERCE - G. E. BUH - R. E. BURTON)

DISTRICT SUPERINTENDENT:- G. F. DANIELS

U. S. (NY) SPECIAL A. G. O. W. B:- PROJECT SUPERVISOR - G. F. LANGE

DISTRICT SUPERINTENDENT:- WM. IRWIN

CLINTON ENGINEER WORKS:- FIELD PROJECT MANAGER - J. D. WILSON (C. S. COLLIER)

DISTRICT SUPERINTENDENT:- WM. KREWATCH

ALABAMA ORDNANCE WORKS:- FIELD PROJECT MANAGER - WM. KREWATCH (R. A. FULLER)

MORGANTOWN ORDNANCE WORKS:- FIELD PROJECT MANAGER - H. W. FRITZ

WARREN RIVER ORDNANCE WORKS:- FIELD PROJECT MANAGER - H. E. FISHER (C. M. WETZEL)

INDIANA ORDNANCE WORKS:- FIELD PROJECT MANAGER - W. E. DOUGLASS

DISTRICT SUPERINTENDENT:- C. H. TRASK

GOPIER ORDNANCE WORKS:- FIELD PROJECT MANAGER - C. H. TRASK (T. BLAKE)

OKLAHOMA ORDNANCE WORKS:- FIELD PROJECT MANAGER - F. H. McDONALD

KANKAKEE ORDNANCE WORKS:- CONSTRUCTION ENGINEER - W. M. FRANCIS

CONTRACTS & STATISTICS:- DIVISION SUPERINTENDENT - S. HEYWARD

SPECIAL ASSISTANT:- H. S. STANTON

CONTROL SUPERVISOR:- D. VOLAREN (D. M. REID)

CONTRACT & COST ENGINEER:- P. J. MASCIOGGI

SERVICES:- DIVISION SUPERINTENDENT - R. W. FULLING

ENGINEERING OFFICE SUPERINTENDENT:- J. M. CHRISTMAN (R. M. WADSWORTH)

PROCUREMENT SUPERVISOR:- J. B. BAXTER (S. D. LIENTZ)

EXPEDITING SUPERVISOR:- Y. A. JOYCE (P. G. WINTERS)

INSPECTION SUPERVISOR:- J. H. SHAW (C. J. VEITH)

MATERIALS & PRIORITIES SUPERVISOR:- R. L. WILLIAMS

PRINCIPAL CONTROL ENGINEER:- L. H. ARNING

SERVICE SUPERVISOR:- B. B. COLGATE

SAFETY:- J. A. DE LUCA

PERSONNEL & TRANSFERS:- G. H. SHELTON

TRAINING:- L. W. NELLGRI

CONSULTANTS:- M. B. EATON

ESTIMATING SECTION:- J. B. MYERS (M. W. RODGERS)

INDUSTRIAL ENGINEERING DIVISION:- MANAGER - J. M. BRENTLINGER

ASSISTANT MANAGER:- R. Y. VAN HESS

FIELD ENGINEERS:

ORGANIC CHEMICALS:- V. W. HADRICH (SECTION HEAD)

P. & P. PLASTICS, EXPLOSIVES:- V. D. BAILEY

GRUBBELL CHEMICALS:- S. H. KNAPP

PICINIS AND CHEM:- A. F. KOZAK

RAYON:- H. V. OGDENBURG

REMINGTON ARMS:- H. N. HEINER

CONSULTANT:- H. B. EATON

ESTIMATING SECTION:- J. B. MYERS (M. W. ROGERS)

INDUSTRIAL ENGINEERING DIVISION:- MANAGER - J. M. BRENTLINGER

ASSISTANT MANAGER:- R. T. VAN NESS

FIELD ENGINEERS:

ORGANIC CHEMICALS:-	Y. W. HAEDRICH	(SECTION HEAD)
P. & P. PLASTICS, EXPLOSIVES:-	V. D. BAILEY	
GRASSELLI CHEMICALS:-	R. M. KNAPP	" "
PIGMENTS AND FLUORS:-	A. F. KOZAK	" "
RAYON:-	H. V. OGGENFURS	" "
WILMINGTON ARMS:-	H. N. HEIXNER	" "

PIONEER SECTION:- F. H. MCBERTY (R. P. FORTER)

CONSULTING ENGINEERS:- H. D. MARRING

ACID AND PROCESS DEVELOPMENT:-	E. S. RIDER
MATERIALS OF CONSTRUCTION:-	C. P. KOSER
INSTRUMENTATION:-	J. L. VOYILLA
UNIT PROCESS:-	H. A. KINGKINER - M. W. MURE - W. A. MENGER

MAINTENANCE:- H. W. SHOCKLEY

MECHANICAL IMPROVEMENT:- WM. STANLAR

MECHANICAL TRANSMISSION AND PACKING:-	J. R. BOYER
LUBRICATION:-	D. P. HILLINGBOROUGH
MATERIALS HANDLING:-	P. A. HILKA
PACKAGING:-	W. F. CRABB

POWER, WATER AND FUELS:- D. C. CARMICHAEL

POWER CONTRACTS:-	E. H. ROWAND
POWER GENERAL:-	R. F. HIGNER - J. I. HUDSON - W. H. KAISER - B. S. NORLING - J. SEGEL

WATER AND TRADE WASTE:- E. B. SHOVELL

TRADE WASTE RECOVERY & TREATMENT:-	R. L. JACOBS
WATER PURIFICATION & TREATMENT:-	L. BERTRAND - L. COX - W. J. SLOAN

MANAGEMENT ENGINEERING:- L. J. KING

METHOD ANALYSIS:-	J. R. BAILEY - L. C. GIBSON
CONTROL-METHODS SCHEDULING & STANDARDS:-	M. C. BUTTERS - R. M. CARPENTER - R. E. HARPER - A. A. VALOIS
OFFICE METHODS:-	W. J. WEBER - J. H. VIDENOR
JOB EVALUATION:-	D. N. STROUSS - R. KEATH

MACHINE DEVELOPMENT:- G. R. JOHNSON - J. R. BALDER - R. R. NYDEGGER - W. S. REYNOLDS

MECHANICAL EXPERIMENTAL AND PLANT STUDIES:

TECHNICAL DIVISION:- DIRECTOR - T. M. CHILTON

CHEMICAL ENGINEERING SECTION:- F. C. KLUTZ (ACTING HEAD)

METALLURGICAL SECTION:- H. L. MAXWELL

CONTROL DIVISION:- MANAGER - W. J. MAY

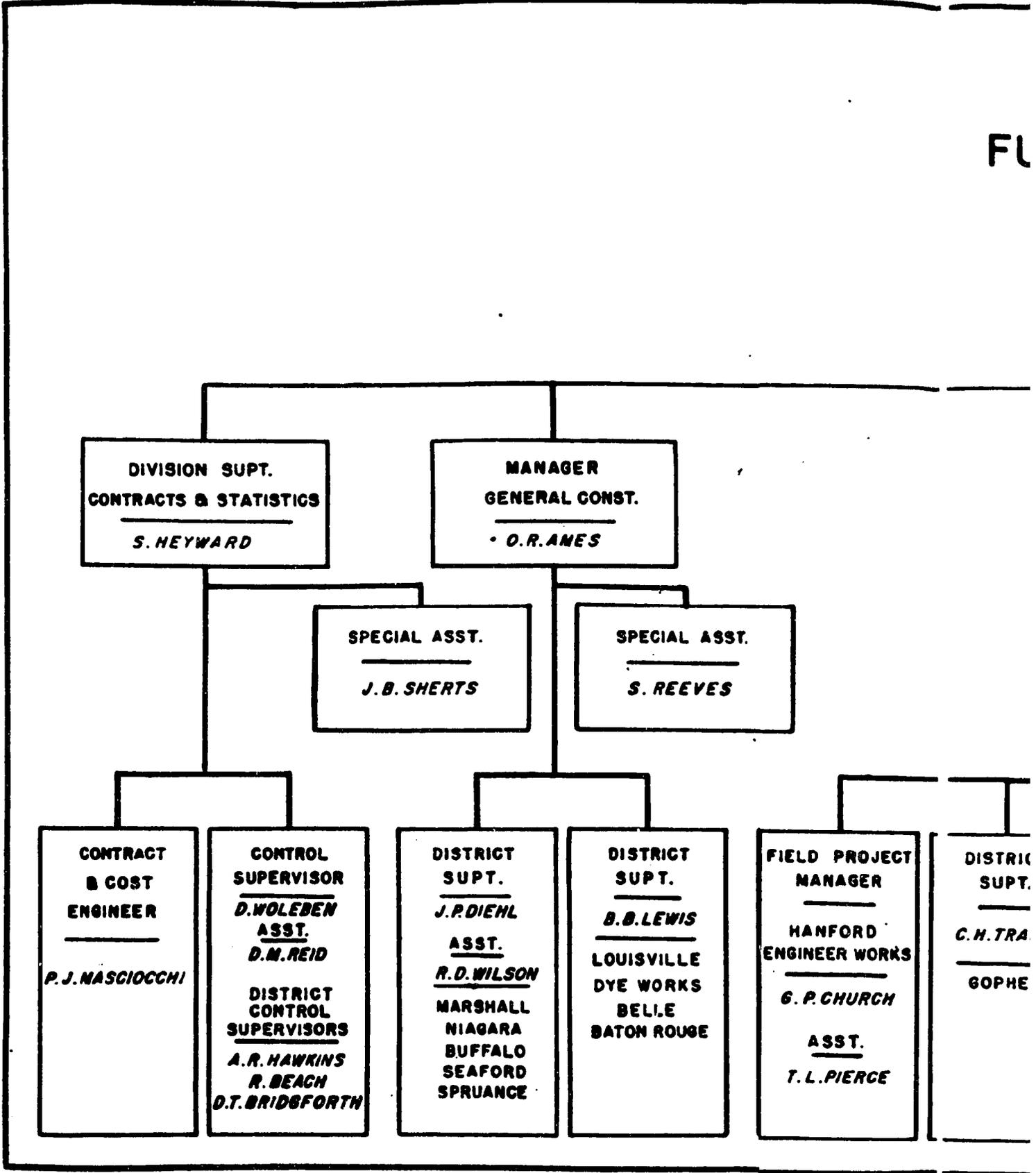
ASSISTANT MANAGER:-	GEO. S. LONG
GENERAL ASSISTANT:-	F. A. WHEELER
SECTION HEAD:-	J. H. AARON
SECTION HEAD:-	G. C. MADRUX

WILMINGTON SHOPS DIVISION:- MANAGER - W. R. HEALD

ASSISTANT MANAGER:-	E. F. GEHNEY
PLANNING & PRODUCTION CONTROL:-	S. G. PALMGREN
SHOP ESTIMATING:-	T. D. ROBINSON
ACCOUNTING & CLERICAL:-	T. HILL, JR.

B Construction Division

Construction Division Engineering Department Organiza-
tion for the major part of construction, was as shown on the
following Historical Organization Chart dated October 5, 1943.



DIVISION SUPT.
CONTRACTS & STATISTICS
- **S. HEYWARD**

MANAGER
GENERAL CONST.
- **O.R. AMES**

SPECIAL ASST.
- **J.B. SHERTS**

SPECIAL ASST.
- **S. REEVES**

CONTRACT & COST ENGINEER
- **P.J. NASCIOCCHI**

CONTROL SUPERVISOR
- **D. WOLEBEN**
ASST.
- **D.M. REID**
DISTRICT CONTROL SUPERVISORS
- **A.R. HAWKINS**
- **R. BEACH**
- **D.T. BRIDGFORTH**

DISTRICT SUPT.
- **J.P. DIEHL**
ASST.
- **R.D. WILSON**
MARSHALL
NIAGARA
BUFFALO
SEAFORD
SPRUANCE

DISTRICT SUPT.
- **B.B. LEWIS**
LOUISVILLE
DYE WORKS
BELIE
BATON ROUGE

FIELD PROJECT MANAGER
- **HANFORD ENGINEER WORKS**
- **G.P. CHURCH**
ASST.
- **T.L. PIERCE**

DISTRICT SUPT.
- **C.H. TRA**
GOPHE

**CONSTRUCTION DIVISION
ENGINEERING DEPARTMENT**

FUNCTIONAL ORGANIZATION CHART

GENERAL MANAGER
M.F. WOOD

MANAGER
WAR CONSTRUCTION
F.H. MACKIE

SPECIAL ASST.
H.S. STANTON

ENGINEERING OF
SUPERINTENDENT
J.M. CHRISTMAN
R.H. WADHAM

DISTRICT
SUPR.
TRASK
PHER

DISTRICT
SUPR.
WM. KREWATCH
ALABAMA
MORGANTOWN
WABASH
INDIANA
OKLAHOMA

DISTRICT
SUPR.
WM. IRWIN
CLINTON
ENGINEER WORKS

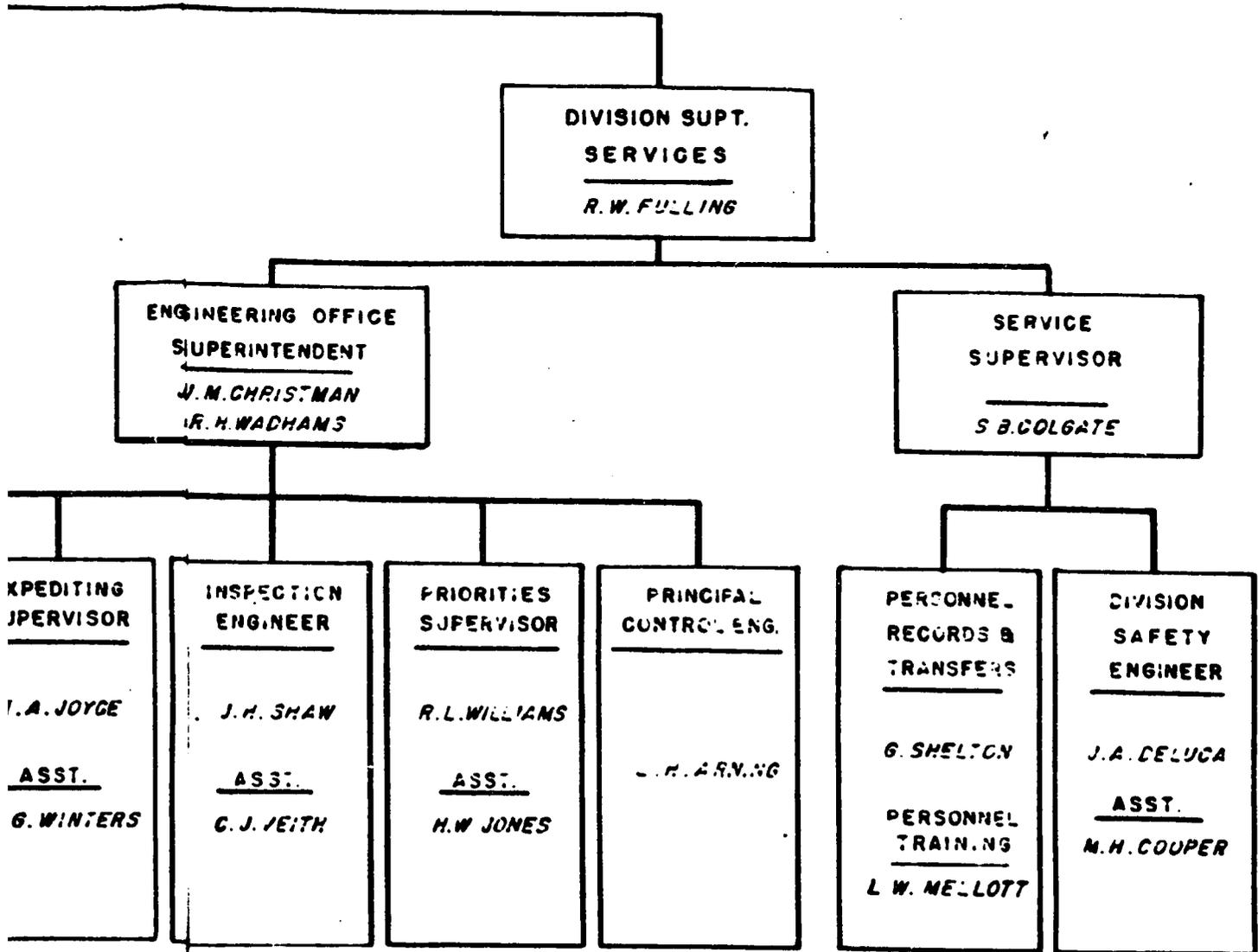
DISTRICT
SUPR.
C.E. DANIELS
SPECIAL
ASSIGNMENTS

PROCUREMENT
SUPERVISOR
J.B. BAXTER
ASST.
S.D. LIENTZ

EXPEDITING
SUPERVISOR
T.A. JOYCE
ASST.
P.G. WINTERS

INSPECTOR
ENGINEER
J.H. SHAW
ASST.
C.J. FEITH

E. I. DUPONT DE NEMOURS & CO. (INC.)



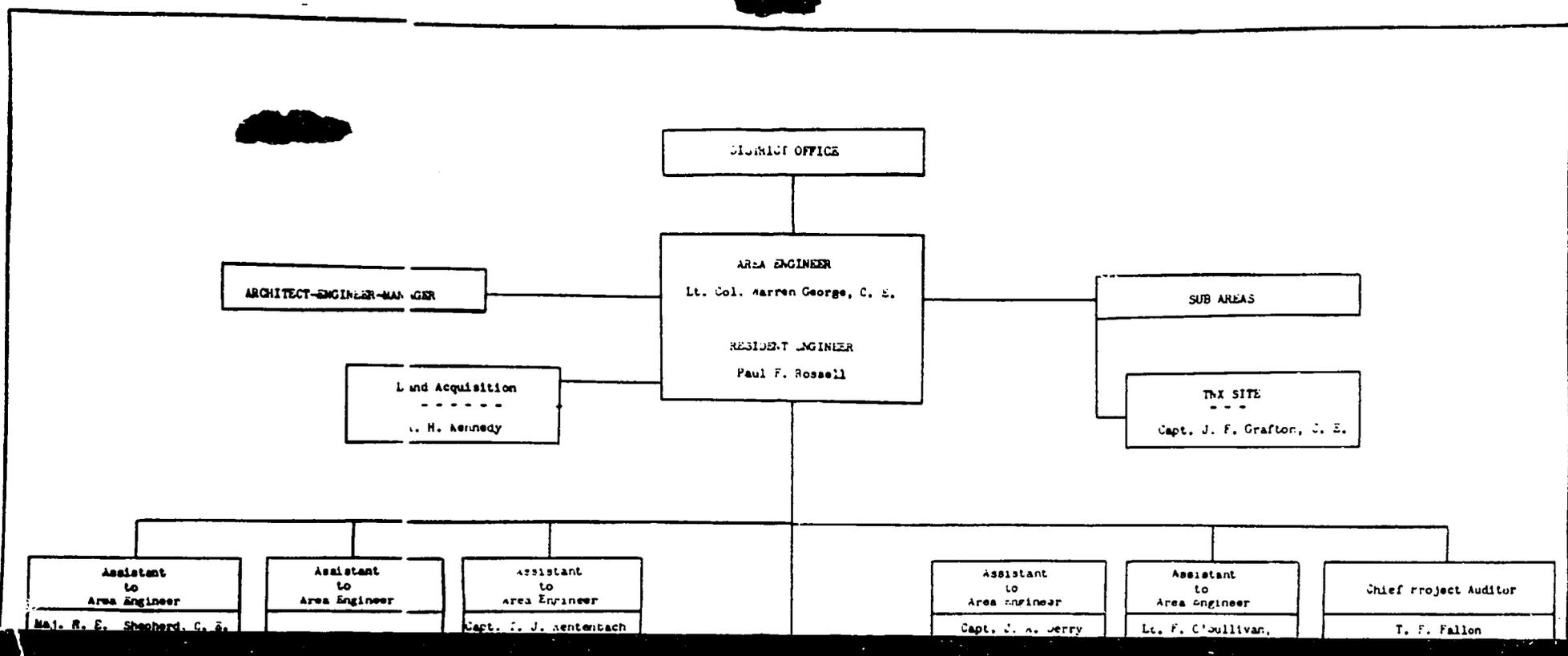
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C Government Organization

The organization of the United States Engineering Corps, Manhattan District, which was responsible for the construction of Clinton Engineer Works, underwent four distinct changes during the construction of the TNV Area.

On October 25, 1942, Major Warren George, United States Corps of Engineers, was transferred to this station and made Area Engineer, Tennessee Area Office, Manhattan District, located at Knoxville, Tennessee, and was responsible for setting up necessary organization for the start of construction at Clinton Engineer Works. As previously mentioned, an office was established on November 5, 1942, at 931 North Central Avenue, Knoxville, Tennessee. The only other government office actively engaged prior to this time was the Land Acquisition Office of the Ohio River Division, United States Engineering Department, located at Harriman, Tennessee.

The organization and personnel of the Area Engineer and changes in organization are shown on the following charts:



DISTRICT OFFICE

ARCHITECT-ENGINEER-MANAGER

AREA ENGINEER
Lt. Col. Warren George, C. E.

RESIDENT ENGINEER
Paul F. Rossell

SUB AREAS

Land Acquisition

H. Kennedy

TNX SITE

Capt. J. F. Grafton, C. E.

Assistant to Area Engineer
Maj. R. E. Shepherd, C. E.

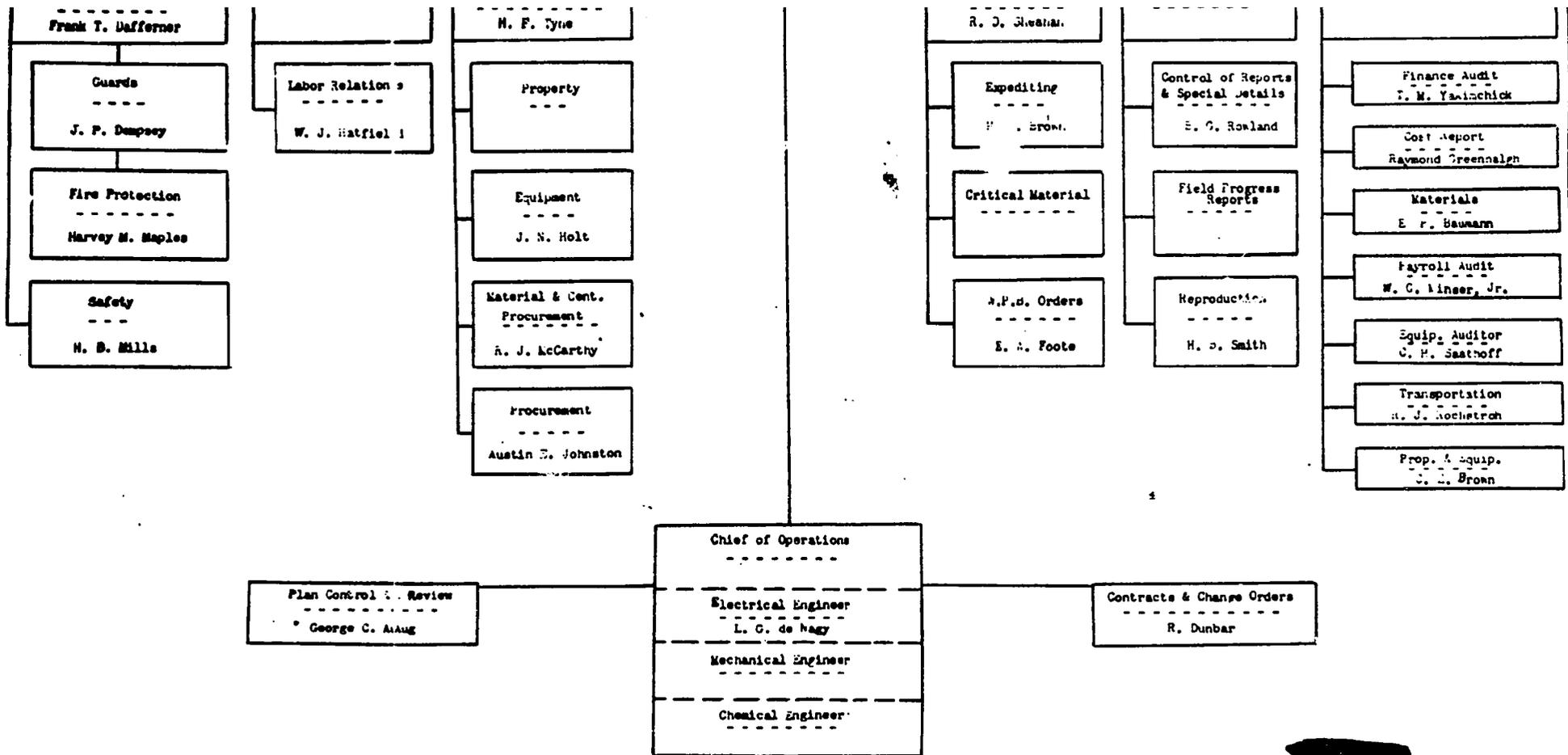
Assistant to Area Engineer

Assistant to Area Engineer
Capt. J. J. Kenterbach

Assistant to Area Engineer
Capt. J. A. Jerry

Assistant to Area Engineer
Lt. F. C. Sullivan

Chief Project Auditor
T. F. Fallon



March 31, 1943

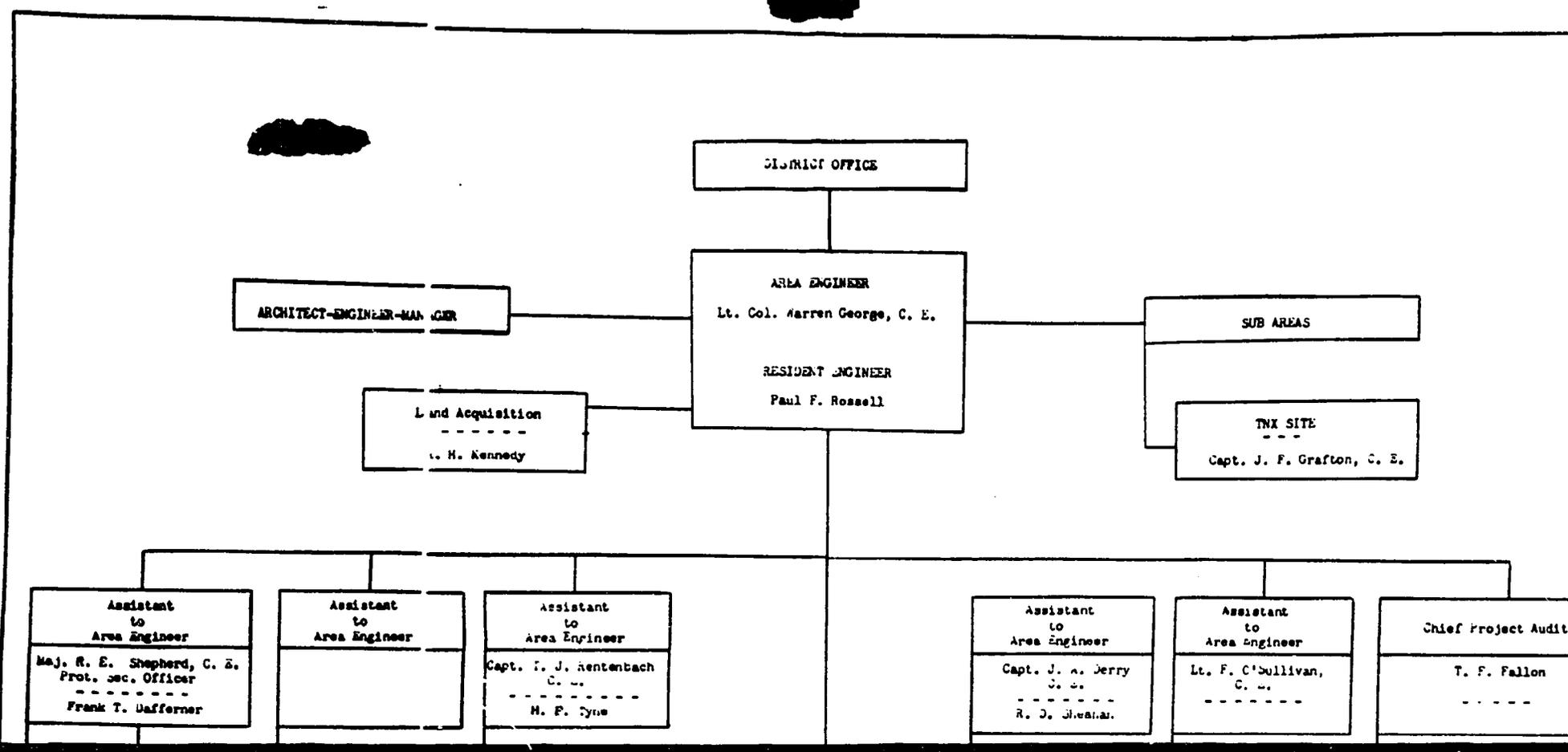
CLINTON ENGINEER WORKS
Knoxville, Tennessee

Office of the Area Engineer

ORGANIZATION CHART
of Sections
Pertinent to the TNX Area

Recommended: *[Signature]*
Principal Engineer
Resident Engineer

Approved: *[Signature]*
Lt. Col., Corps of Engrs.
Area Engineer



DISTRICT OFFICE

ARCHITECT-ENGINEER-MANAGER

AREA ENGINEER

Lt. Col. Warren George, C. E.

SUB AREAS

RESIDENT ENGINEER

Paul F. Rossell

Land Acquisition

Lt. H. Kennedy

TNX SITE

Capt. J. F. Grafton, C. E.

Assistant
to
Area Engineer

Maj. R. E. Shepherd, C. E.
Prot. Sec. Officer

Frank T. Daffner

Assistant
to
Area Engineer

Assistant
to
Area Engineer

Capt. T. J. Rentenbach
C. E.

M. F. Tyne

Assistant
to
Area Engineer

Capt. J. A. Jerry
C. E.

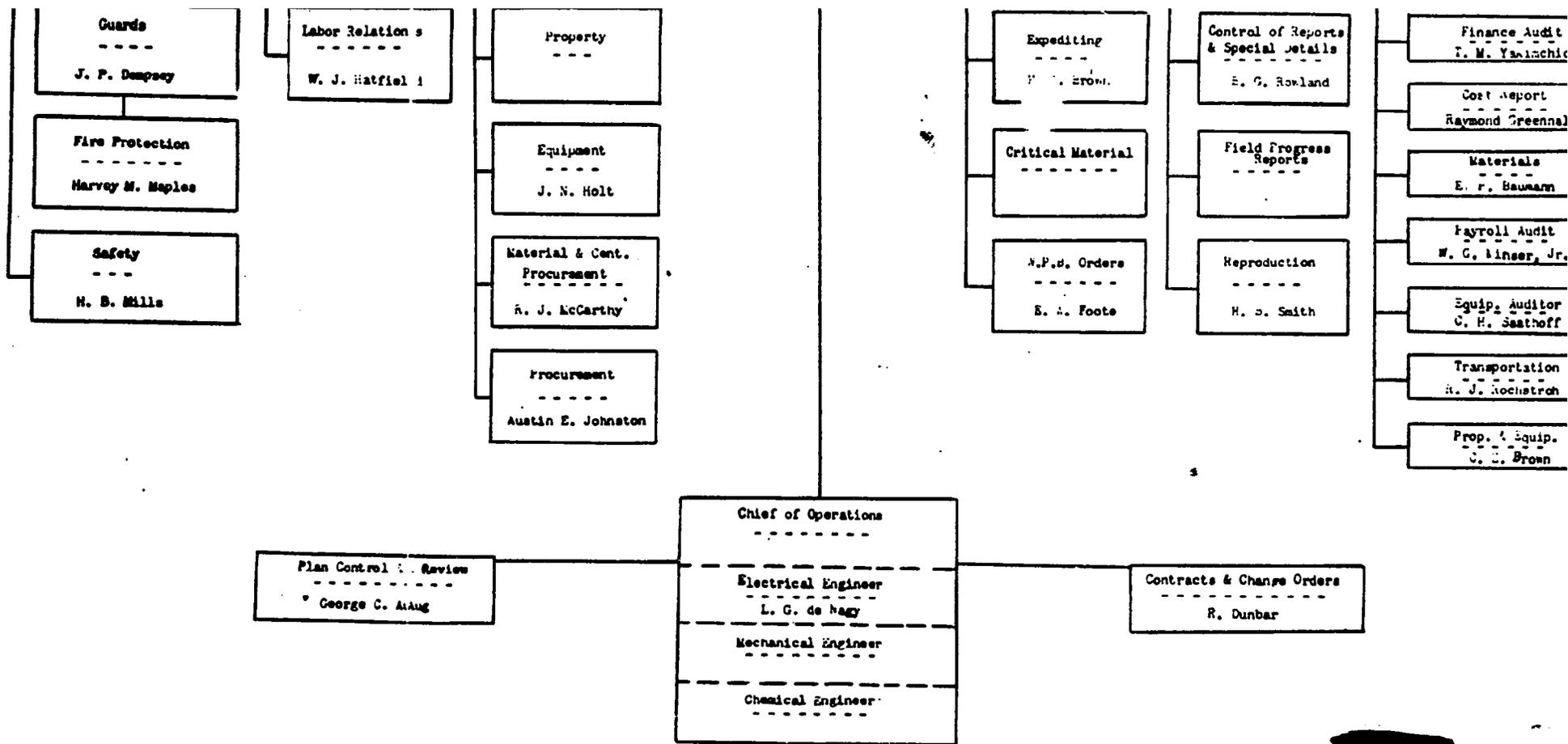
R. J. Sheehan

Assistant
to
Area Engineer

Lt. F. C'Sullivan,
C. E.

Chief Project Auditor

T. F. Fallon



March 31,

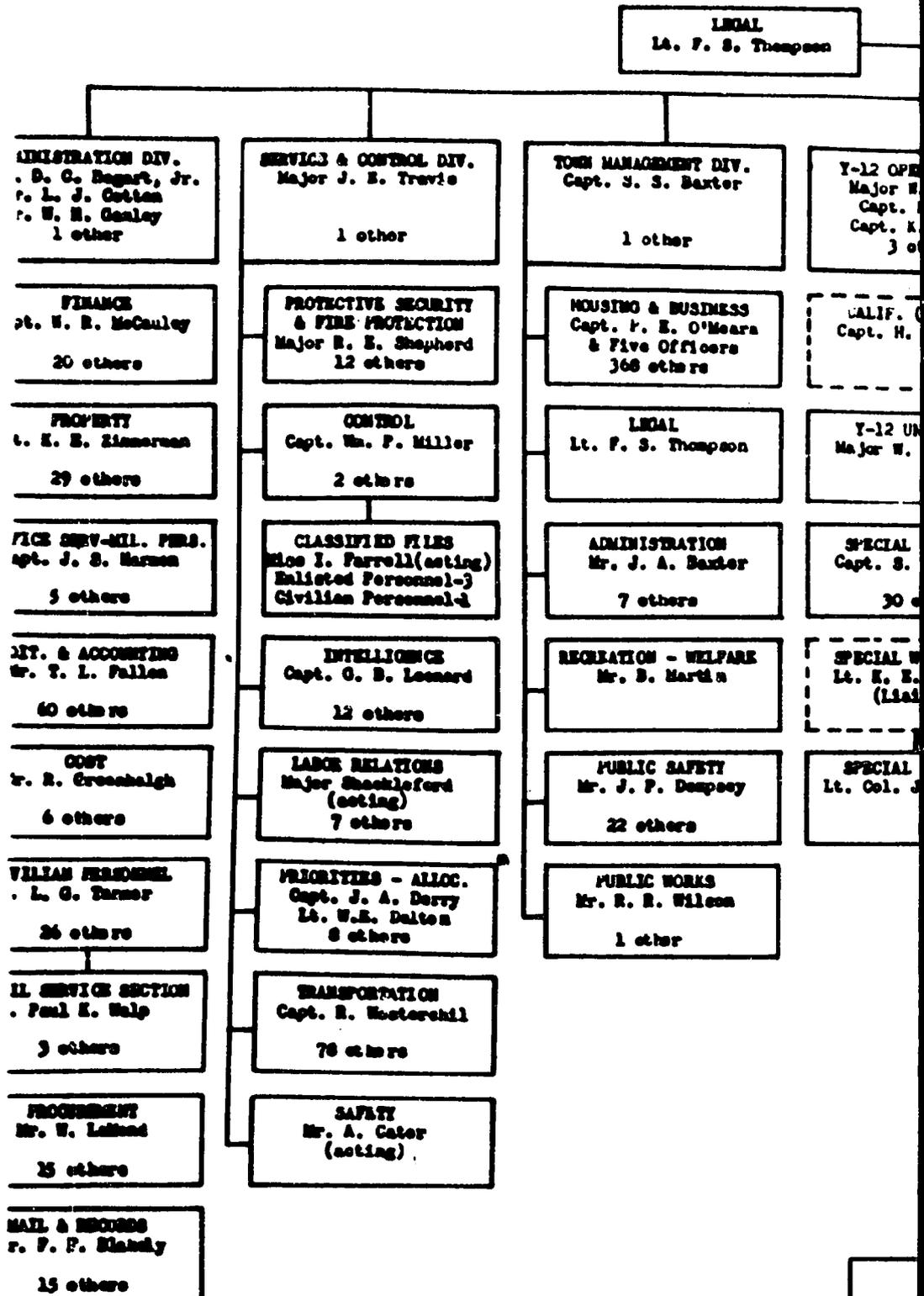
CLINTON ENGINEER WORKS
Knoxville, Tennessee

Office of the Area Engineer

ORGANIZATION CHART
of Sections
Pertinent to the TNX Area

Recommended: *[Signature]*
Principal Engineer
Resident Engineer

Approved: *[Signature]*
Lt. Col., Corps of
Area Engineer



DEPUTY DISTRICT ENGINEER
Lt. Col. T. T. Crenshaw

EXECUTIVE ASSISTANT
Capt. E. J. Bloch
Other

50 OFFICERS
3 ENLISTED WACS
1035 CIVILIANS

MEDICAL
Dr. Chas. E. Rea
13 others

CON DIV.
Kelley
Moore
Dunbar
Other

TRK OPERATING DIV.
Maj. A. V. Peterson
Capt. J. F. Grafton

ENGINEERING DIV.
Major P. F. Rosell

1 other

CONSTRUCTION DIV.
Lt. Col. Warren George
Capt. T. J. Rentenboch

1 other

(Liaison)
Fidler

CHICAGO (Liaison)
Major A. V. Peterson

UTILITIES
Major M. O. Swanson

1 other

CONSTRUCTION REPORTS
Lt. F. O'Sullivan

4 others

PUMP MSE-RESVR-ETC
Capt. R. L. Crawford

1 other

CHIEF
Kelley

K-25 OPERATING
Major W. W. Wagner
(Liaison)

SITE PLANG-HWYS & RR'S
Capt. E. B. Calvin

1 other

PHOTOC - REPRODUCTION
Mr. H. B. Smith

6 others

HWYS-RR-GRADING
Capt. B. F. Marx

DURYS
Powers
Other

K-25 UNIT CHIEF
Lt. Col. J. C. Stowers

MACH-HEAT-VENTILATING
Capt. R. E. Engel

MATERIALS & EQUIP'T.
Capt. W. H. Seaman

23 others

SEWERS - WATER, ETC.
Mr. E. Thomas

MA
Sherman
)

NEW YORK AREA
Lt. Col. Stowers

WATER SUP. & SEWAGE
DESIGN
Capt. W. C. Young

ADMINISTRATION AREA
LABORATORIES
Lt. D. W. Glover

3 others

DWELLINGS II
Major J. H. Turner

2 others

TRIAL
Ruhoff

COLUMBIA (Liaison)
Major B. E. Hough

STRUCTURAL DESIGN
Lt. E. D. McLaughlin
Lt. H. D. Walker
1 other

CONTS. & CMO.-ORDERS
Mr. E. J. Dunbar

5 others

DWELLINGS I
Capt. Van S. Reid

7 others

SUB-PROJ'TS-PLAN REVW
Mr. E. A. Wende

7 others

PLAN CONTROL
Mr. G. C. Aug

12 others

TOWN LAYOUT - UTIL'S
Mr. LeRoy Jackson

SAFETY
Mr. H. B. Mills

3 others

Y-12
Major R. Blackledge
Capt. J. S. Benson

9 others

CONCRETE
Mr. E. J. McCarthy

3 others

K-25
Major W. W. Wagner

2 officers
1 other

MISC. TOWN BLDG.
Mr. G. C. Aug

2 others

TRK
Capt. J. F. Grafton
Capt. T. G. Watkins

1 other

WILMINGTON (Liaison)

Major W. L. Supper

ORGANIZATION CHART

CLINTON ENGINEER WORKS

Approved: *Thomas T. Crenshaw*
Thomas T. Crenshaw
Lt. Col., C. E.

AREA ENGINEER
 Lt. Col. Thomas Y. Cronan
 Captain E. J. Bloch
 1 other

53 Officers
 592 Civilian

MADISON DISTRICT

- PROCUREMENT
- CLASSIFIED FILES
- MAIL & RECORDS
- LEGAL & CONTRACTS
- MILITARY PERSONNEL

THE OPERATING DIV.
 Major A. V. Peterson
 Captain J. P. Grafton

T-12 OPERATING DIV.
 Major W. E. Solley
 Captain B. C. Moore
 Captain E. A. Dunbar
 3 others

TOWN MANAGEMENT DIV.
 Captain P. E. O'Hearn
 Captain L. S. Jameson
 1 other

ENGINEERING DIV.
 Major F. F. Russell
 1 other

MEDICAL DIVISION
 Dr. Chas. E. Bee
 1 other

CHICAGO (Liaison)
 Major A. V. Peterson

CALIFORNIA (Liaison)
 Captain M. A. Fidler

INDUSTRY & BUSINESS
 Captain A. H. Kerr
 Captain J. J. Anderson
 & Officers

SITE PLANNING & UR'S
 Captain E. B. Collins
 1 other

PROCTOLOGY
 Dr. Wm. C. Hornstein

HOSPITAL DIRECTOR
 Dr. W. D. Holt
 Lt. J. B. ...
 & others

6-25 OPERATING
 Captain W. P. Wells
 (Liaison)

T-12 UNIT CHIEF
 Major W. E. Solley

ADMINISTRATION
 Mr. J. A. Baxter
 37 others

HEAT-HEAT-VENTILATING
 Lt. G. W. Willard

ENT. MEDICINE
 Dr. Joseph Ryan
 1 other

PHYSICIAN
 Dr. Albert Hays

COLUMBIA (Liaison)
 Major S. E. Smith

SPECIAL ACCOUNTS
 Lt. S. D. Powers
 30 others

PUBLIC WORKS
 Mr. S. H. Wilson
 1 other

WATER SUPPLY & SEWERAGE DESIGN
 Captain W. C. Young
 1 other

ENT. MEDICINE
 Dr. Asher White

URINALYSIS
 Dr. Ed O. ...

DETROIT (Liaison)
 Major F. M. ...

STRUCTURAL DESIGN
 Lt. S. B. ...
 1 other

PEDIATRICS
 Dr. C. E. ...

PUBLIC HEALTH
 Dr. L. L. ...
 Dr. S. J. ...

RESEARCH-PLANNING DIV.
 Mr. S. A. ...
 7 others

ENT. MEDICINE
 Dr. Frank Bryant
 1 other

CYTOLOGY & HISTOLOGY
 Dr. W. L. ...

COMMUNICATIONS
 Major S. G. ...
 2 others

ENT. MEDICINE
 Jean ...
 22 others

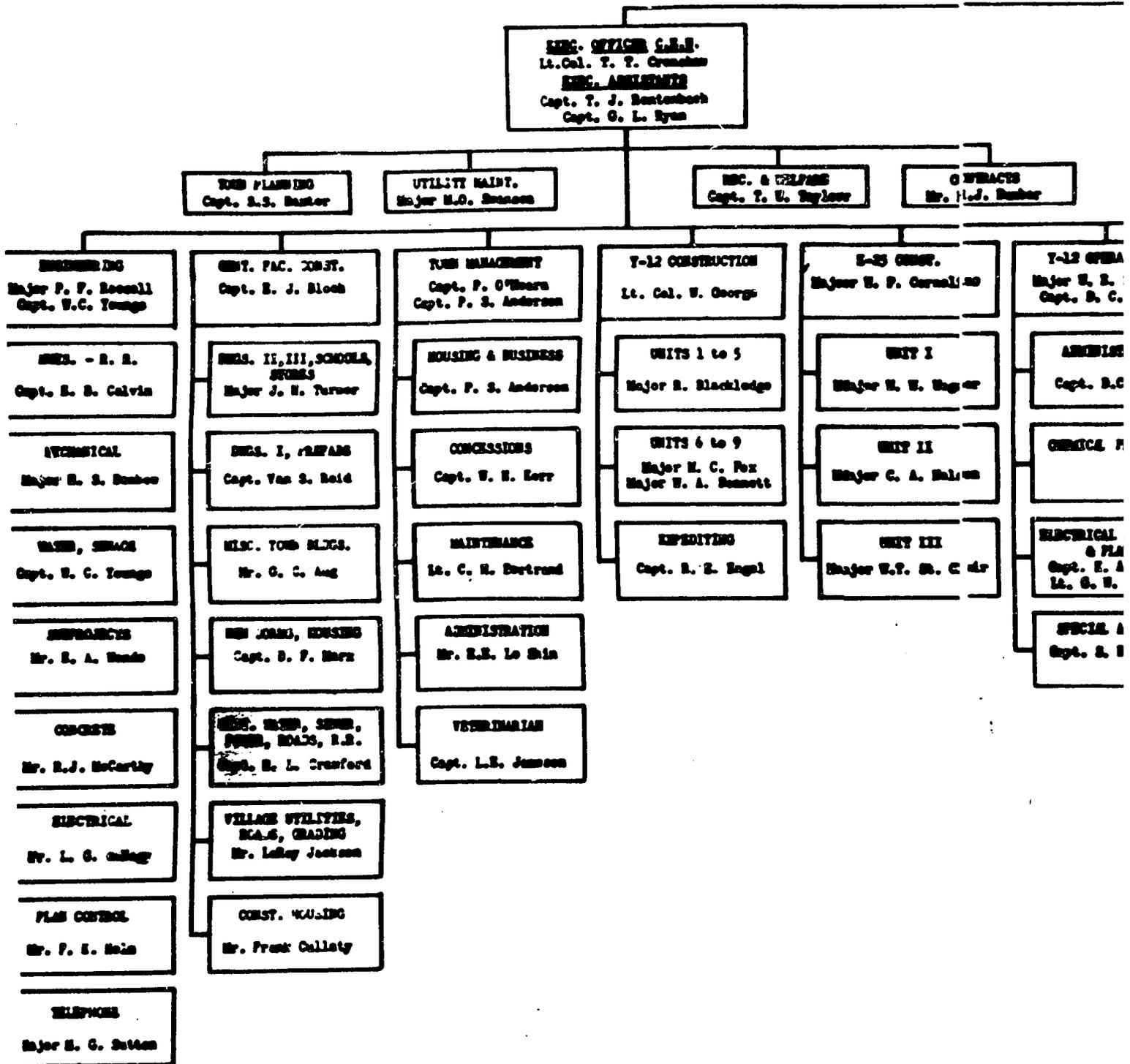
ENT. MEDICINE
 Dr. ...
 Dr. Harry ...

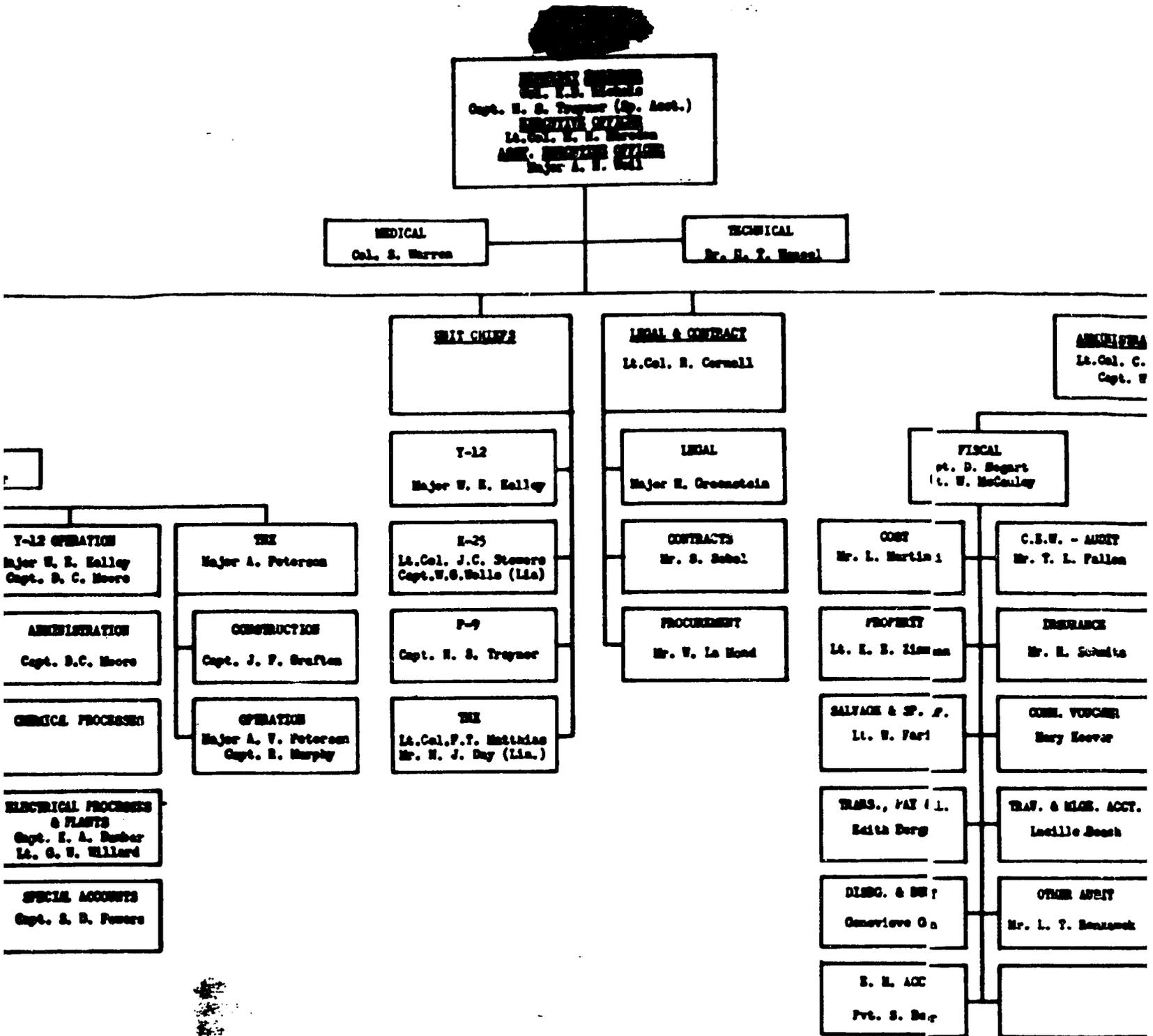
OFFICE MANAGER
 Geo. ...

LABORATORY & DIAGNOSTIC
 Miss Grace ...
 Mrs. ...
 & others

RECORDS DIV.
 Certificate ...
 & others

ORGANIZATIONAL CHART
 LISTED IN ...
 Approved by *Thomas Y. Cronan*
 Thomas Y. Cronan
 Lt. Col., C. E.
 1 October 1963

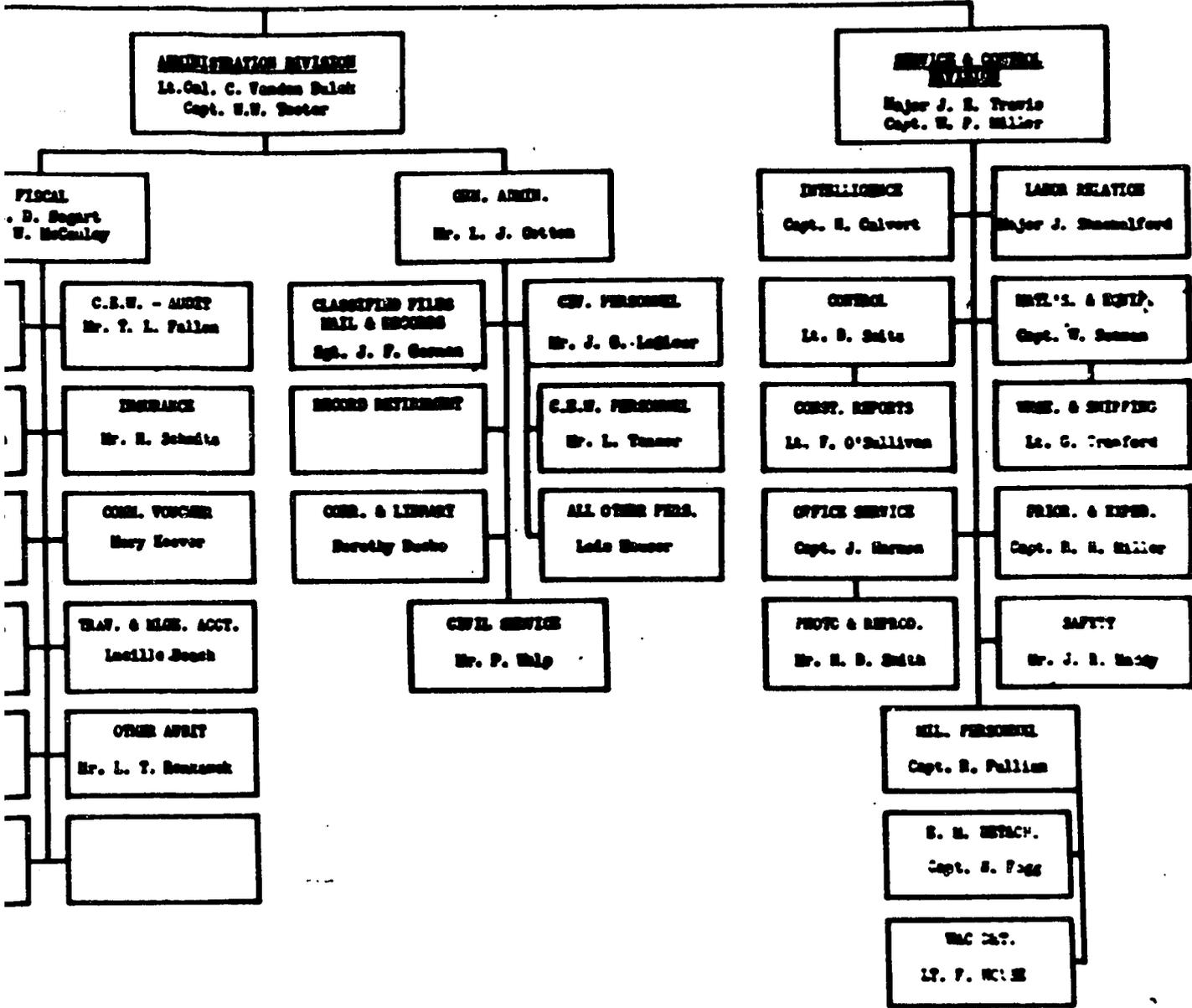




ORGANIZATION CHART
OFFICE OF DISTRICT ENGINEER
MANHATTAN DISTRICT
OAK RIDGE, TENNESSEE

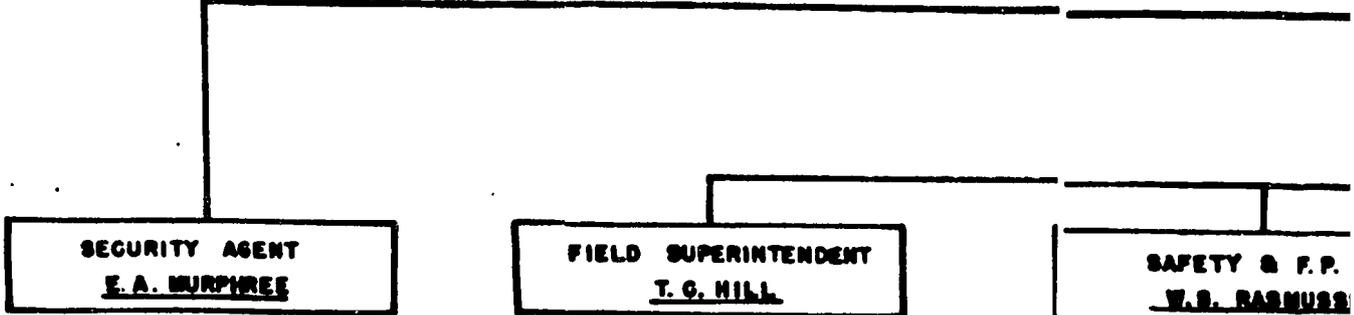
Approved: *F. H. Mattheis*
Lt. Col., Corps of Engineers
Executive Officer

11 November 1943



D. Plant Organization

The majority and peak of construction work for Projects 9755 and 58 was performed under the organization and personnel as shown on Construction Division, Clinton Engineer Works Projects 9755 & 58 Functional Organization Chart, dated October 1, 1945

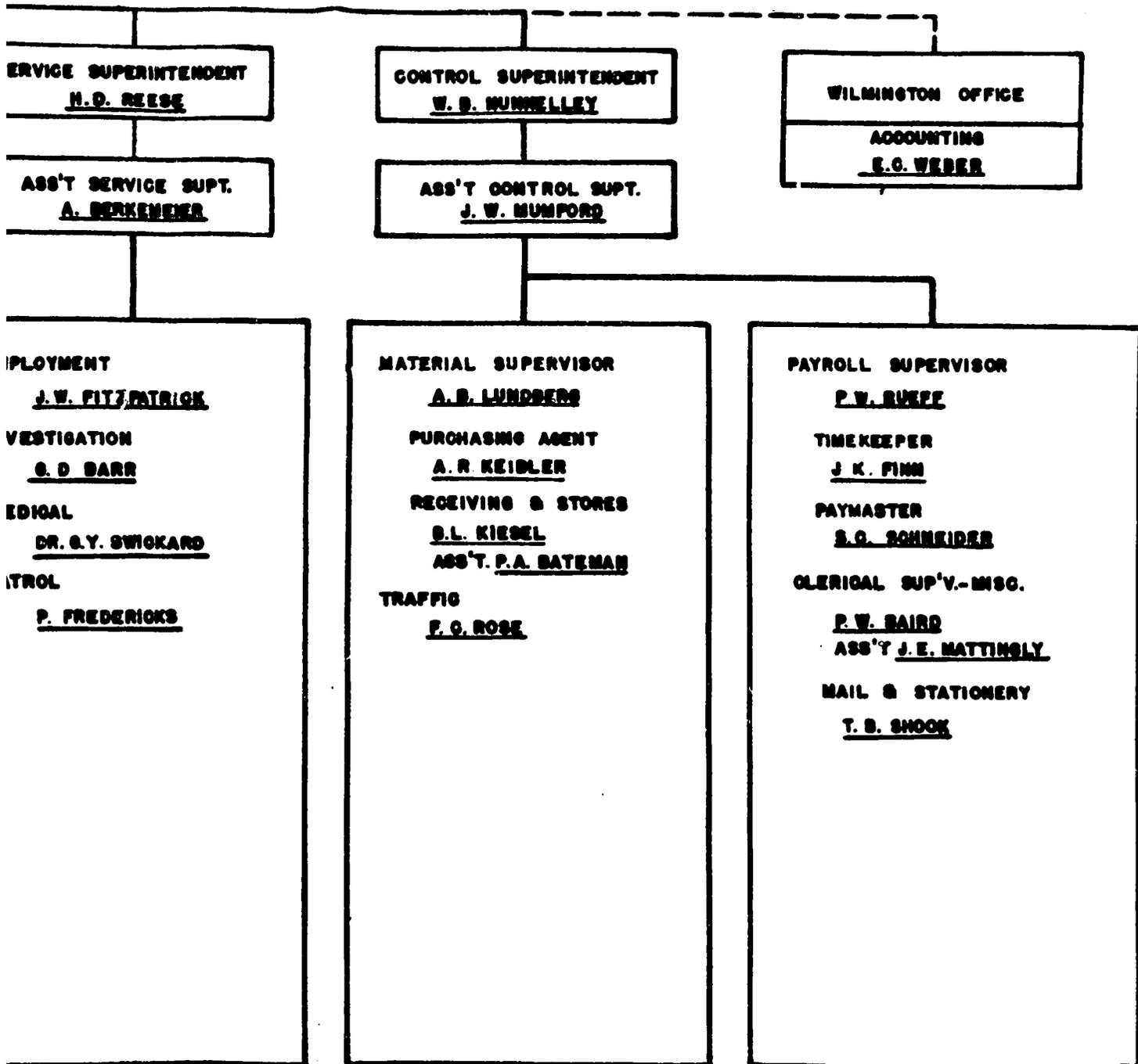


DIVISION OR AREA ENGINEERS		
AREA	ENGINEER	ASSISTANT
SERVICE & LAYOUT	R.T. GARDNER	
100 & 200	J.E. EARLEY	
300 (PROJECT 58)	R.O. STANTON	
700 & T.G.	W.E. RANDOLPH	
800	H.W. MILLER	
INSTRUMENTATION	D.H. ABBOTT	
SHIFT	W.S. LEWIN	

CRAFT SUPERINTENDENTS		
CRAFT	SUPERINTENDENT	AREA OR
GEN. BLDG.	G.L. DORSEY	
CARPENTER	W.F. COOK	
LABOR	M.A. SPEAR	H.E. MUN
RIGGER	R.G. LDWELL	
TRANSPORTATION	R.J. JOBORN	D.R. BAI
CONCRETE	J.B. TELTON	R.W. ERI
REINF. STEEL	J.E. COLBIN	
ELECTRICAL	E.D. HELMINTOLLE	L.J. BOY
PIPE	H.L. GALLIGAN	G.H. TAY
MILLWRIGHT	B. SPARLAND	J.R. MOI
105 AREA GEN.	G.V. HASTY	
105 AREA	J.F. BUMPUS	W.E. CHI W.F. ALI W.T. RIZ G.O. HO G.H. LU E.J. ST E.M. MI
305 AREA (PROJECT 58)	J.H. RUFFNER	G.L. ZA E.E. SA
SHIFT SUPT. (BLDG)	R.P. COFFEY	
SHIFT SUPT. (BLDG)	W.I. EPPERSON	
SHIFT SUPT. (MWT)	T.H. BROWN	
SHIFT SUPT. (ELECT)	R. DOREY	
SHIFT SUPT. (PIPE)	S. SANTOWSKI	

RT

E. I. DUPONT DE NEMOURS & COMPANY, INC.



C R A F T S

CRAFT	SUPT.	ASST. SUPT.	RECORDS ENGR	GANG FOREMEN
GENERAL BUILDING CARPENTER LABOR	C. L. DORSEY W. F. COOK M. A. SPEAR	H. E. NUNLEY G. A. GOODWIN (SHIFT) S. L. GANN (ACT.) D. R. BARNHILL R. W. ERICKSON F. M. KIRKPATRICK (ACT)		38 4 PAINTERS 43
RIGGER TRANSPORTATION CONCRETE REINF. STEEL	R. CALDWELL R. J. OSBORN J. YELTON J. E. COLGIN			2 14 9 4
ELECTRICAL	E. D. HELMINTOLLER	L. J. BOYETT R. C. DOREY (SHIFT)	J. C. SAULS	24
PIPE	H. L. GALLIGAN	G. H. TAYLOR J. F. SANTOWSKI (SHIFT)		21
MILLWRIGHT	S. HSFARLAND	J. R. MOSS T. M. BROWN (SHIFT)	G. G. MATTHEWS	20
IOB AREA	G. W. HASTY (GEN.) J. P. DUMBUS	W. F. ALMON W. T. SIZER G. O. HOY E. M. MILLER W. E. CHAPUT B. J. STONE G. H. LUTZEMBERGER	R. M. KENADY W. A. BARR (ASST.) H. E. BEDELL (ASST.) P. L. RYAN (ASST.)	10
SHIFT. SUPT. (3 RD.)	R. H. COFFEY			
SHIFT SUPT. (1 RD.)	W. H. EPPERSON			
PROJECT 50	J. H. RUFFNER (SHIFT)	E. E. GARNER G. L. ZAKAIS		

CLINTON ENGINEER WORKS
PROJECT 9733
FIELD ORGANIZATION

FIELD SUPT.
T. C. HILL

NO	FOREMEN	CLERKS
1	4 PAINTERS	1
43		1
9		1
14		2
9		1
4		
24		1
21		1
28		2
10		0
	1 RAFTSMAN	

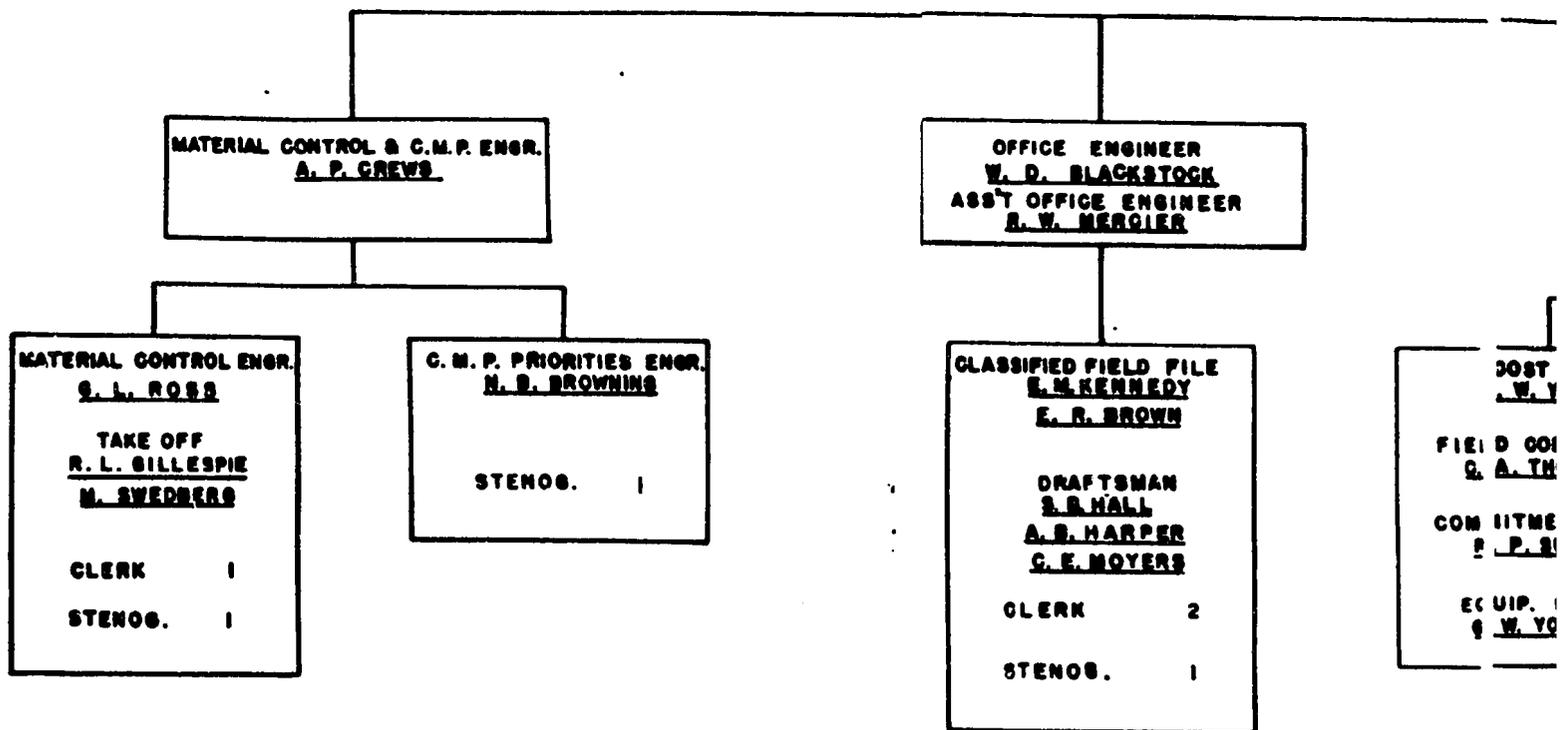
AREA	ENG	
	DIV. ENGR.	ASST. DIV. ENGR
SERVICE & LAYOUT	R. T. GARDNER	W. A. BASKETTE (LAYOUT)
100 & 200	J. E. EARLEY	
700 & T. C.	W. E. RANDOLPH	
800	H. W. MILLER	
INSTRUMENTATION	D. H. ABBOTT	
PROJECT 58	R. C. STANTON	
SHIFT	W. S. LEWIN	

ENGINEERS				
GR.	ASST. DIV. ENGR.	ENGINEERS	ROOMEN	CLERKS
	W. A. BASKETTE (LAYOUT)	P. L. COX S. H. CADY 7 INSTRUMENT MEN J. H. FRANKFORT E. DEBUHR J. H. EOBELL S. E. FOSB S. D. BLAKELEY H. E. JACOBS J. K. MURDIN C. H. LITTLE H. M. RUPERT W. P. PARIS G. P. WALTER E. M. VASS	20	2 DRAFTSMAN

I

PM

SEPTEMBER 1, 1943



MATERIAL CONTROL & C.M.P. ENGR.
A. P. CREWS

OFFICE ENGINEER
W. D. BLACKSTOCK
ASST OFFICE ENGINEER
R. W. MERCIER

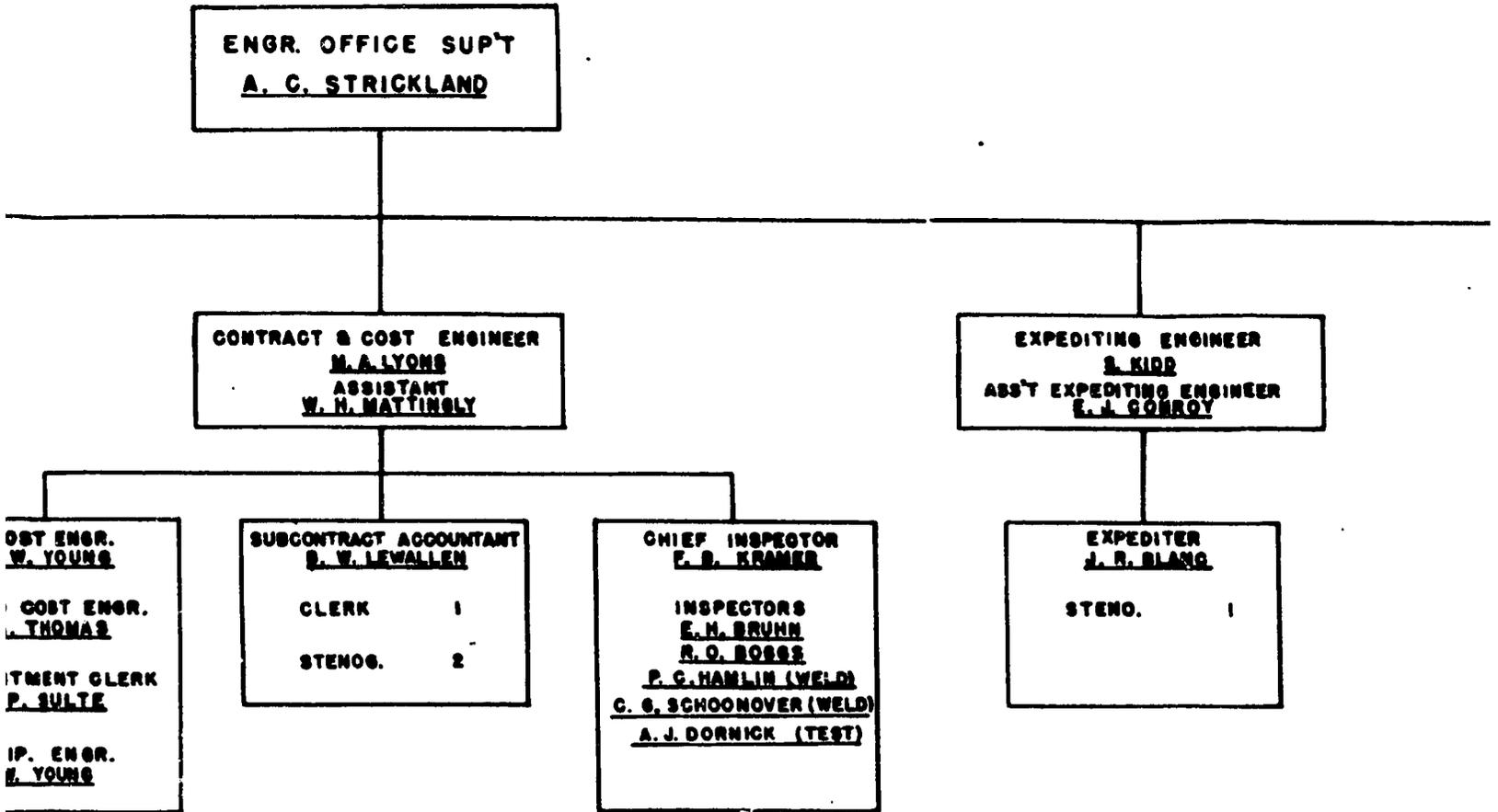
MATERIAL CONTROL ENGR.
S. L. ROSS
TAKE OFF
R. L. GILLESPIE
M. SWEDBERG
CLERK 1
STENOS. 1

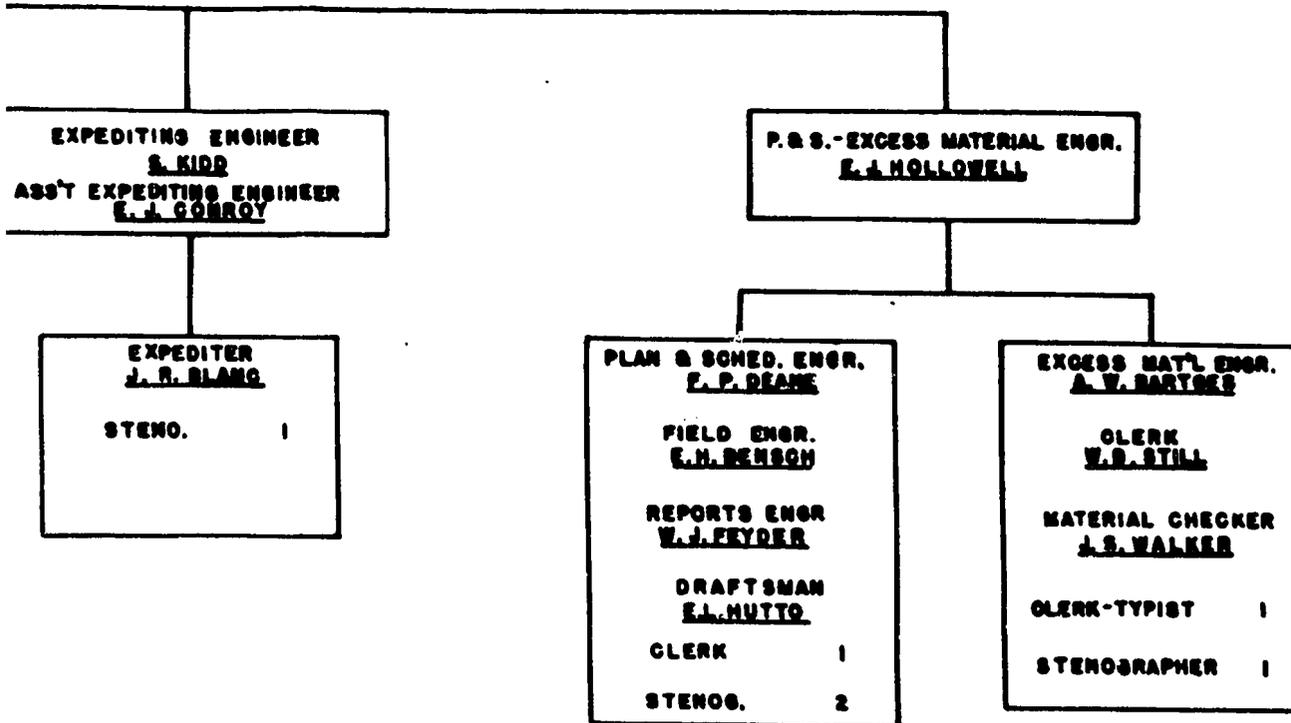
C. M. P. PRIORITIES ENGR.
N. D. BROWNING
STENOS. 1

CLASSIFIED FIELD FILE
E. M. KENNEDY
E. R. BROWN
DRAFTSMAN
S. B. HALL
A. B. HARPER
G. E. MOYERS
CLERK 2
STENOS. 1

POST
W. Y.
FIELD CON.
Q. A. TH
COM. ITME
P. P. S
EQUIP.
W. YC

CLINTON ENGINEER WORKS
PROJECT 9733
ENGINEERING OFFICE
ORGANIZATION





OCT. 1, 1943

PERSONNEL
J. W. FITZPATRICK
ASST. H. M. HULS

INTERVIEWERS
M. ROBBINS
R. H. COOK
G. HINDS
SIGN - UP
H. DOUGLAS
CLERKS 8
RATIONING & S. S.
E. D. SMITH
CLERKS 4
RECEPTIONIST 1
STENO'S. 1
STENO'S. (REESE) 1

INVESTIGATIONS
G. D. BARR

INVESTIGATORS
F. CRAWFORD
J. F. MELTON
CLERKS 3
TYPIST & STENO'S 4

**CLINTON ENGINEER WORKS
PROJECT 9733**

**SERVICE DEPARTMENT
FUNCTIONAL ORGANIZATION CHART**

**SERVICE SUPERINTENDENT
H. D. REESE**

**ASSISTANT SERVICE SUP'T.
A. BERKEMEIER**

**MEDICAL
DR. G. Y. SWICKARD**

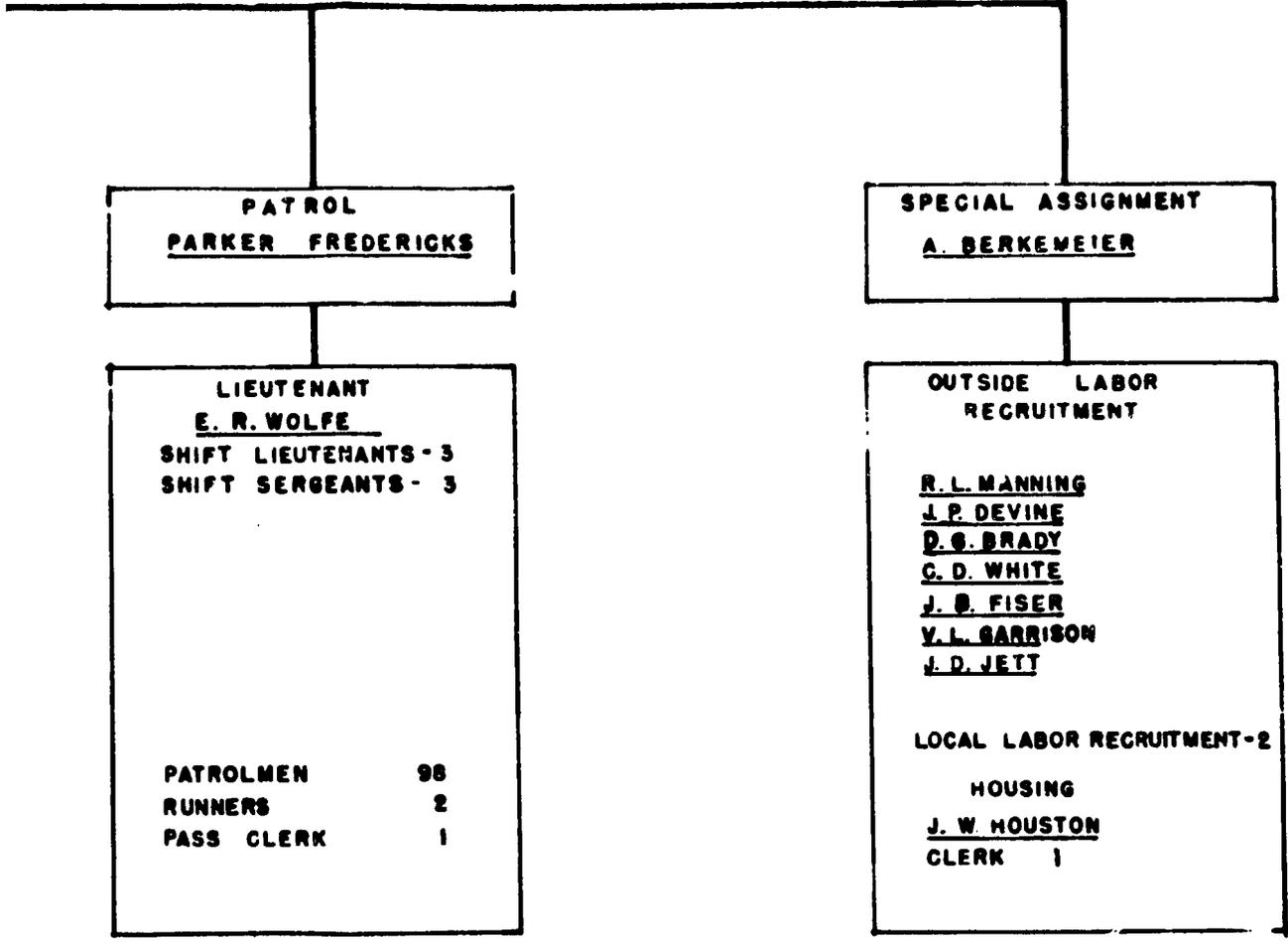
**PHYSICIANS
DR. L. D. MILLER
DR. McCARTER BROWN**

**ABSENTEE CLERKS 1
OFFICE CLERK 2
NURSES 4
STENO'S. 1**

**PATROL
PARKER FREDERICKS**

**LIEUTENANT
E. R. WOLFE
SHIFT LIEUTENANTS - 3
SHIFT SERGEANTS - 3**

**PATROLMEN 98
RUNNERS 2
PASS CLERK 1**



PATROL
PARKER FREDERICKS

LIEUTENANT
E. R. WOLFE
 SHIFT LIEUTENANTS - 3
 SHIFT SERGEANTS - 3

PATROLMEN	98
RUNNERS	2
PASS CLERK	1

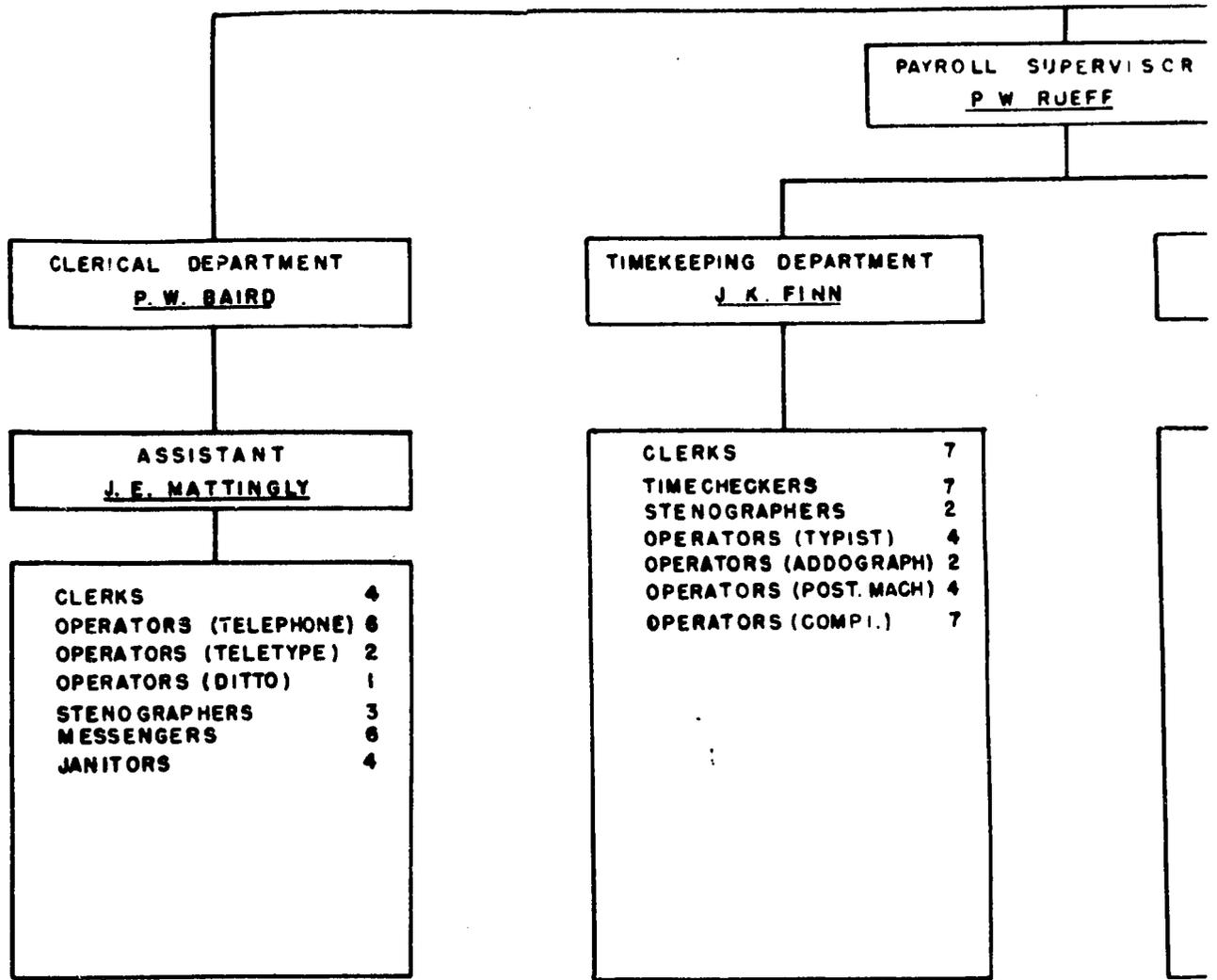
SPECIAL ASSIGNMENT
A. BERKEMEIER

OUTSIDE LABOR RECRUITMENT

R. L. MANNING
J. P. DEVINE
D. G. BRADY
G. D. WHITE
J. B. FISER
V. L. GARRISON
J. D. JETT

LOCAL LABOR RECRUITMENT-2

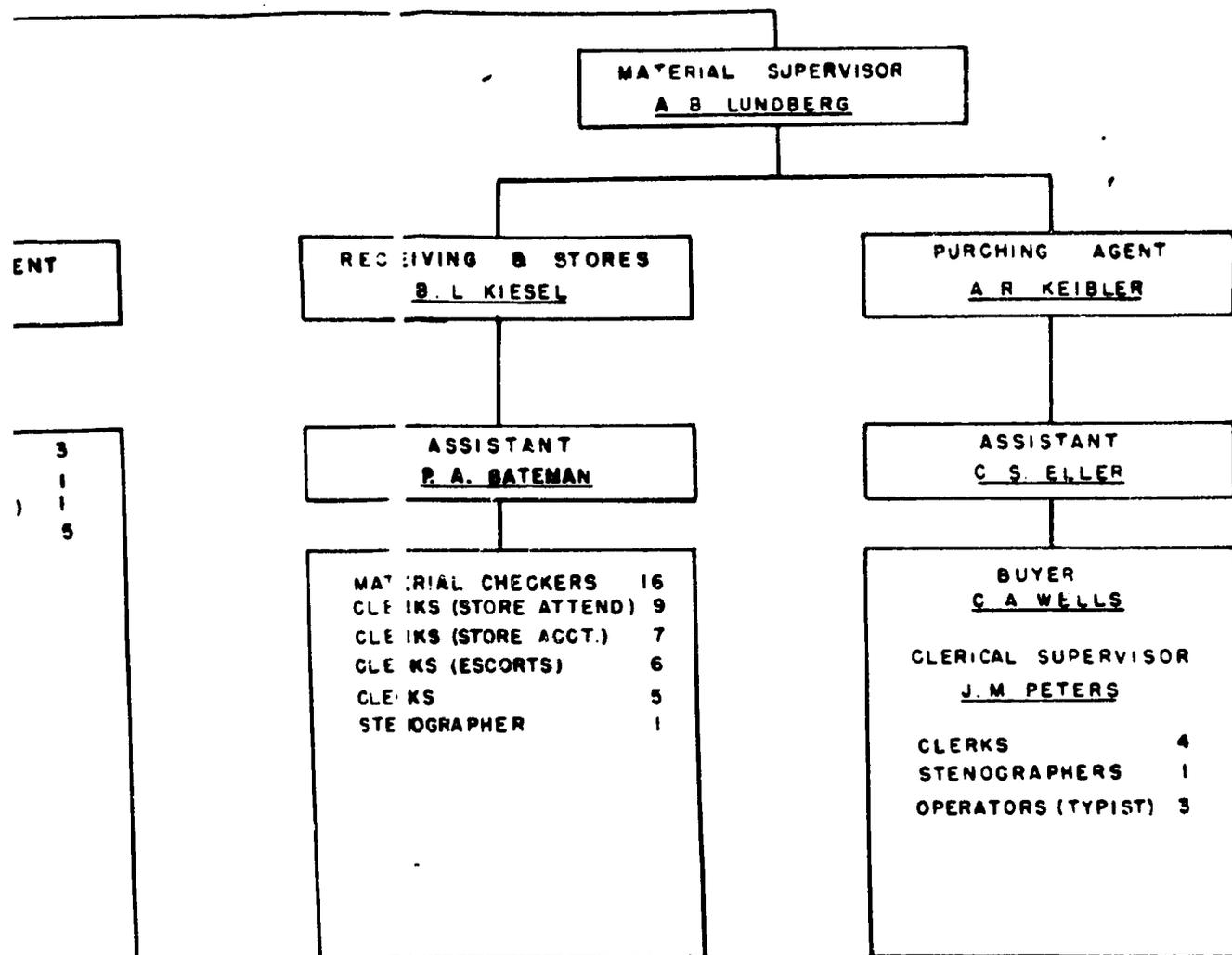
HOUSING
J. W. HOUSTON
 CLERK 1



RT

ENT

3
1
1
5



V GENERAL HISTORY

A Preliminary Work

The initial step in organizing this project for construction began January 13, 1943. A Field Project Manager was selected, and prior to going to the plant site spent several days in Wilmington, Delaware, Home Office of the L. I. du Pont de Nemours Company, (Inc.), and received preliminary instructions relative to the opening up of the project for construction. He assisted in the selection of key personnel.

On January 25, 1943, the Field Project Manager arrived in Knoxville and opened up a construction office in Room 902 of the Farragut Hotel. All key personnel registered and obtained quarters at the Farragut Hotel. The first Staff Meeting of the key personnel was held at the Hotel in Room 902 on January 25, 1943, for the purpose of introduction of supervisory personnel and explanation of the Security System set up for this project.

The City of Knoxville, Tennessee, was selected as the most suitable location in which to set up temporary offices because communications, transportation facilities, and living quarters were not available in the immediate vicinity of the du Pont Site.

On January 27, 1943, the du Pont Company rented the structure at 422 West Cumberland Avenue to be used as a temporary office. This building was formerly known as the Leavoy-Leach Infirmary. A post office box, number 1551, was rented at the new Post Office located at 400 West Main Avenue.

On Sunday, January 31, 1943, the offices were moved from the Farragut Hotel to the Cumberland Avenue address. The Purchasing, Employment, Traffic, Investigation, Costs and Contracts, Medical, and Excess Material Departments opened at the Cumberland Avenue address on Monday, February 1, 1943. All furnishings were provided by the government. The Accounting and Auditing sections remained in the Farragut Hotel.

Offices were maintained throughout the major part of the construction period at this address, as the functions of the Employment, Investigation, and Purchasing Departments would have been seriously handicapped as communication and transportation facilities were inadequate and the location of the plant site was too far from the population center for local employment.

The first investigation of the site was made on January 29, 1943, with representatives of the Design Division of the Company. A general reconnaissance of the area was made, with special attention being given to the location of a site for the river pumping station. Three possible sites were studied for the location of this structure. The sites examined were at the junctions of

[REDACTED]

Raccoon Creek and Clinch River, White Oak Creek and Clinch River, and Walker Branch and Clinch River. Special attention was given to accessibility, distance from the TNX Area, and economic routes for the water supply line running from the location to the area. Sanitation entered in the final determination of the site, and the location finally chosen was that at the junction of Walker Branch and Clinch River, which is upstream from the water course into which the effluent of the TNX Area is discharged.

Layout began February 1, 1943, at which time horizontal and vertical controls were established. During the week ending February 5, 1943, the Temporary Construction Area was laid out, and topography of the site was taken and furnished the Wilmington Office.

The preliminary sub-surface and exploration work for this project consisted of making core borings, and the setting up of test tables at various building locations, to determine load bearing conditions of the soil and in order to proceed with foundation design for buildings and structures.

A total of forty separate borings were made, totaling approximately one thousand four hundred and forty feet. Rock cores 1 3/4" in diameter were also obtained. This work was started on March 8, 1943, and completed on April 4, 1943, by the Giles Drilling Company, New York, N. Y., drilling contractor employed by the Area Engineer for making sub-surface investigation at Clinton Engineer Works. Core borings were only made for buildings and structures requiring more than twenty-five hundred pounds per square foot bearing loads, such as the following buildings: 101-Process Area Shop, 105-Process Building and Pile, 115-Exhauster Building and Stack, 205 Separation Building and Stack, 206-Tank Farm, 201-Roller House, 202-Reservoir, 207-Water Treatment House, 213-Filter Plant, 214-River Pump House.

Samples of each core boring, as well as log sheets, were forwarded to the Design Division in Wilmington, in order to proceed with foundation design for these buildings. The core borings were more or less uniform in structure throughout the project site.

The top soil was a red clay gravel, varying in depth from four to thirty feet, which overlaid intermittent layers of shale and soft limestone separated by clay seams. The average depth of hard gray limestone varied from eight to forty-four feet due to topographic relief within the plant site. A series of twelve tests were made by erection of test tables in the 100, 200, 700, and 800 Areas. The soil bearing load for red clay gravel varied from five thousand to twelve thousand pounds per square foot.

On February 2, 1943, Craft Superintendents, Division Engineers, Safety, Time, and Receiving Departments moved to temporary quarters at the Scarboro School, and were the first du Pont offices opened on the Government Reservation. The School is located approximately 7.2 miles from the project site. The Accounting and Auditing Sections moved from the Farragut Hotel to the temporary

field offices at Scarborough School on February 20, 1943.

In order to expedite the opening of construction offices on the project site, subcontracts were let for construction of certain buildings. On February 20, 1943, the Craft Superintendents and Division Engineers, Receiving, and Safety Departments moved from the Scarborough School into offices constructed at the site. The latter were the first offices opened on the project site.

The Engineering Office Superintendent and Control Superintendent's groups consisting of Cost and Contracts, Planning and Scheduling, Excess Materials, Material Control, C. M. P., Expediting, Central Files, Time and Payroll, Mail, Stationery, and Clerical Departments, were moved to Scarborough School February 24, 1943. The Management, Purchasing, Personnel, Employment, Traffic, and Investigation Departments remained at the Cumberland Avenue location because of the lack of communication and transportation facilities at the plant site and the following groups of offices were tentatively located at 422 West Cumberland Avenue consisting of Field Project Manager and Assistant, Traffic Department, and Security Agent.

The Purchasing, Employment, and Personnel Offices for the E. F. Shaw Company, piping subcontractor, were moved from 313 West Cumberland Avenue, Knoxville, on May 8, 1943, to the plant site.

The offices in the Scarborough School were moved on May 1, 1943, into the permanent Administration Building constructed by a subcontractor on the plant site. Construction offices remained there until June 26, 1943, when it was occupied by the Clinton Laboratories, at which time the construction offices were moved into a Temporary Administration Building TC-53. On January 10, 1944, the Service Superintendent, Purchasing, Investigation, C.M.P., and Expediting Offices were moved from 422 West Cumberland Avenue, Knoxville, Tennessee, to the plant site. The sole remaining employment office was closed at the above address on January 22, 1944, and was likewise moved to the plant site. The lease on the Knoxville Office expired January 30, 1944.

The Scarborough School obtained their drinking water from a drilled well located within the school building. This supply was insufficient for the entire needs of the field construction group and it was necessary to transport drinking water by tank truck from Clinton, Tennessee.

In order to facilitate the employment of subcontractors' men, a badge office was opened adjacent to the area on March 2, 1943.

During the early stages of organizing, the field maintained constant contact by telephone and telegraph with the Wilmington Office, keeping them fully advised as to the progress being made and availing themselves of all the facilities of the Company in order to expedite the starting of construction.

B Available Facilities

1. Transportation

The City of Knoxville is served by the Greyhound Line and Tennessee Coach Company as well as several other companies serving the vicinity. It is the terminal of the Louisville and Nashville Railway Company and the Southern Railway System. Air service is provided by the American Airlines Incorporated, Delta Air Lines, and Pennsylvania-Central Airlines Corporation. There are thirty-three motor freight companies serving the community providing both short and long haul service. Byington, Tennessee, was established as the shipping point for all material furnished this project and as no rail service was provided into the area, all material had to be transported to the plant site by truck, a distance of fifteen miles, entailing the additional handling of all material. A contract for handling freight between Byington and the project was let on February 23, 1943, to A. J. Metler on Order No. XPC-456. The prevailing rates were as follows: \$.70 per ton for unloading, \$2.65 per ton hauling charge from Byington to the plant site. A total of approximately 26,000 tons was handled by the above contractor during the entire construction period.

Initial shuttle service between Knoxville and the plant was started on February 8, 1943, when offices were opened at Scarborough School. Mail service was provided the school four times daily. As the project moved into construction, additional shuttle service was provided between Knoxville and the plant. A schedule was maintained with shuttles leaving both the Cumberland Avenue Office and the Administration Building at the plant at one and one-half hourly intervals during the day shift. Shuttle service at other hours was provided upon call.

Government owned cars were provided for the use of certain key personnel. It was required that these cars, with the exception of the car provided for the use of the Project Manager, be stored nightly in a garage selected by the government. Operators of the cars were required to have a drivers license issued by the government.

2. Communications

The Southern Bell Telephone Company, a subsidiary of American Telephone and Telegraph Company, provides Knoxville with telephone service. Western Union Telegraph Company and Postal Telegraph Cable Company furnish the telegraph service. The respective facilities of the aforementioned companies were used as needed by du Pont.

On February 12, 1943, a one position switchboard was installed in the Knoxville Office in order to provide a more adequate service and, on February 15, 1943, a TXK teletype service was inaugurated. This latter service was contracted for on a message and time basis.

Telephones were installed at the Scarboro School on March 15, 1943, in order to provide the first construction offices located on the reservation with communication service with Knoxville. Service to the construction area was started on April 7, 1943, and on May 1, 1943, a two position switchboard was installed providing service for approximately one hundred and thirty stations. On May 10, 1943, a TLX teletype service began operations at the plant. This service was increased on July 26, 1943, with the addition of a TLX teletype service, direct line to Wilmington Office. This service was rendered on a monthly leased wire basis.

Until August 6, 1943, telephone service between the plant and Knoxville was maintained through two county lines and two direct lines to the control office of the Southern Bell Telephone and Telegraph Company, as well as one direct line connected to the Knoxville Office switchboard. This service was found to be insufficient to meet the demands and, on August 6, 1943, two additional lines were provided for long distance service only. This change in service greatly expedited the completion of long distance calls.

The permanent automatic dial telephone equipment in Building 703 was placed in operation during March 1944, replacing the manual system used by the construction organization.

3. Electric Power

The Tennessee Valley Authority furnished electric power to the surrounding communities which are interconnected by networks with various hydro-electric plants of the system.

It was estimated that the power requirements for construction would be approximately 300 kilowatts at 0.70 Power Factor. It was desired that this power be furnished by 440 volts, 3 phase, 60 cycle. It was further estimated that the operating plant power requirements would be at least 350 kilowatts and allowing for possible expansion not more than 750 kilowatts at 0.80 Power Factor. It was thought that the transmission line constructed to provide temporary power possibly could be used to furnish the requirements of the operating plant.

The Tennessee Valley Authority had been approached by the government relative to the furnishing of power to the company. Due to the urgent need for electric power, the Authority informed the company that a 12 kilovolt transmission line could be built more quickly from the south. It was decided to build this line as it would have a capacity of approximately 1000 KVA and if possible use it for operating power. This line was connected into a 12 kilovolt Norris rural system having its permanent substation at Lenoir City. The government advised the company that it desired that all lines on the government reservation be owned by the United States of America. To connect to transmission line constructed on the reservation, it was necessary that the Authority build a line from their rural system to the reservation, a

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distance of approximately one mile.

The service received over the 12 kilovolt line was not satisfactory as there were numerous shut-downs and power failures and it was therefore necessary to construct a second transmission line which was connected into a more reliable network. This line will be discussed under 205 Purchased Power. The original transmission line was maintained and used as a standby source of power.

C Temporary Construction

The temporary construction work of Projects 9733 and 58 consisted of the construction of 94 buildings and 36 facilities as listed on pages 38 to 43 and was confined mainly to the southeastern portion of the TTX Area. This area was staked out during the week ending February 13, 1943. This location was set aside at the beginning of construction in order to avoid interference with the construction of the permanent plant structures and was designated as the temporary construction area, as indicated on the plot-plan for the TTX Area shown on page 9.

The use of abandoned buildings in the immediate vicinity of the plant site was made in order to accelerate the starting up of temporary construction on this job and also to eliminate needless expenditure of labor and material.

A vacated building on the north side of "C" road at the northeast corner of the plant site was occupied on March 25, 1943, and used as headquarters for the No. 5 fire station, to which 5 fire trucks were assigned for the protection of the plant and property within Zone 4, as shown on the Fire Protection Map, page 173. In order to have a water supply for fire protection, temporary earthen dams were constructed to create reservoirs at the northeast corner at the south border, and on the west border of the TTX Area, as shown on page 284, Topographic Map 2844 Clinton Engineer Works.

The type of temporary construction used throughout consisted of wood frame structures covered by drop siding with gabled or flat roofs covered with rolled asphalt roofing. Mud sills were used for the foundations of all stationary buildings, and the smaller type structures were built on skids for mobility.

The use of concrete floors was confined to only three buildings; namely, TC-58 vault section of the Temporary Administration Building, TC-19 Garage, and TC-55 Temporary Laundry Building. Wooden floors were placed in all office and storage buildings; crushed stone and cinders were used in all shop buildings. All buildings were provided with wooden louvre ventilators and with 6-light sash, 8" x 10" glass. Except for TC-58 and 59 Temporary Administration Building and New First Aid Building, and TC-4 Receiving Office, which were heated with steam, and TC-64 Excess Material, which was heated with electric heaters, all office buildings were heated with coal stoves. Open type electric wiring was used for lighting purposes in all buildings, and all 440 volt power wiring for the shop structures was encased in conduit.

The first temporary construction work began on February 2, 1943, when the Layne Central Company of Memphis, Tennessee, was awarded a contract for the drilling of an 8" well to supply drinking water. This was later identified as Building 311. The drilling at the site was started on February 9, 1943, and finished on February 19, 1943. The well location plant coordinates are N-22330 and E-30304.

Approximately 30 feet of well casing was installed sealing off the strata overlying the rock. The well was tested on March 2 and March 3, 1943, for a period of 25 hours at a flow of 45 gallons, at which time it was determined that the drawdown was 69 feet.

Mr. W. J. Sloan of the Industrial Engineering Department, who was here at the time the well was tested, stated that in his opinion the well could not be rated at more than 100 gallons per minute as the capacity of rock wells at increased rates of discharge is unpredictable.

During drilling several bailer tests were run, and prior to installing the equipment with which the well was to be tested a bailer test was run indicating a capacity of the well of at least 45 gallons per minute.

This well was not placed in operation until April 16, 1943, due to the late delivery of the pumping equipment and its use was discontinued and the well capped on October 7, 1943.

The water from this well was never used for drinking purposes as the supply was limited and not of the best quality and bacteriological tests of the water showed contamination. It was used for the washroom and toilet facilities in the Main Office Building.

Prior to the time the River Pump House was placed in operation, the drinking water for the construction forces was transported by tank trucks. During the early stages of construction, drinking water was obtained from a well located in Scarboro School and at a spring house located on the plant site. The use of the spring house as a source of supply was discontinued on February 15, 1943, upon receipt of laboratory report indicating that the water was contaminated. A number of springs in the immediate vicinity were tested and found unsafe for drinking water purposes. It was then necessary to transport water by tank truck from Clinton, Tennessee, a distance of approximately 20 miles. On August 1, 1943, this service was discontinued. Samples of the drinking water were taken periodically and bacteriological tests were made by the laboratories of the Tennessee Department of Public Health in Knoxville.

During the first three weeks of construction, emphasis was placed upon the repairing of the main entrance road known as the Bethel Valley Road and now identified as Road "C" from the stone quarry located on Road "C" approximately 5.2 miles northeast of the plant and the preparation of the sub-grade for roads from the TC Area. The main entrance road was a single lane gravel surfaced roadway and a number of narrow wooden culverts and fords had to be repaired in order to facilitate the movement of material to the plant site. This work was delayed due to the lack of sufficient road building equipment. A contract was let for the relocation and widening of the main road from the quarry to the plant site on February 22, 1943, and although the contractor

arrived on the project site on March 1, 1943, the work on the road was not started until March 8, 1943.

In order to expedite the movement of the construction offices to the plant site, contracts were awarded for the construction of three temporary construction buildings and one permanent building; namely, TC 3 - Division Engineers' and Craft Superintendents' Building, and TC 4 - Receiving Warehouse and Stores Building, and 703 Administration Building.

It was originally intended that the construction offices would occupy Building 703, Main Office Building, throughout the entire construction period, thereby eliminating the erection of a temporary administration building. The construction forces were unable to retain these offices due to the early occupation by Clinton Laboratories on July 22, 1943, which necessitated the construction of TC-58 and 59, Temporary Administration and First Aid Buildings respectively.

The type of construction used for these buildings was similar to that used for the 700 Area Service and Administration Buildings. After the close of construction, these buildings are to be used by the Operating Department. They have the same facilities as those installed in Building 703.

The Company was required to furnish living quarters for approximately 541 employees who were unable to find quarters within the vicinity of the plant, in order to comply with regulations of the United States Employment Service that labor would not be imported into densely populated sections where there existed a shortage of housing facilities unless living quarters were available. Therefore, the Company obtained permission from the Area Engineer to convert the Scarboro School into a dormitory which was capable of housing 275 men. The men housed at the Scarboro School Dormitory were fed by the cafeteria on the plant site during the greater part of construction.

Prior to the setting up of the Scarboro School Dormitory, permission was obtained from the Area Engineer for the temporary quartering of du Pont Labor at the Stone & Webster Hutment Area. This began on June 13, 1943, and continued throughout the major part of the construction period, as the Scarboro School Dormitory was too small to meet the total demands for living quarters by du Pont Labor. The men quartered in the Hutment Area were transported by du Pont trucks and fed at the Hutment Cafeteria. At one time there were 286 du Pont Employees living in the Hutment Area.

Repairs were made to the White Wing Ferry Road and to the ferry, which served as an additional route to the plant site. This made available additional living quarters for construction workers in the area in the vicinity of Lenoir City and Loudon, Tennessee, which was somewhat isolated from the project site.

Canvas tents were erected for the storage of equipment and

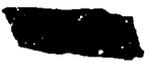
materials, thereby saving critical materials and manpower which could be used for other permanent construction work.

Temporary lighting and power for the Temporary Construction Area was first furnished by portable gasoline driven generator sets, which were suitably located to serve the buildings in the area. The Tennessee Valley Authority provided the Clinton Engineer Works Project with electrical power. Du Pont Company was authorized by Major Warren George of the United States Engineer Office to negotiate directly with the Authority for the building of a transmission line to furnish temporary power for construction purposes.

An agreement was executed on February 1, 1943, providing for the payment to the Tennessee Valley Authority a net construction charge of \$5,000 for the transmission line and booster station built off of the reservation and the sum of \$15,000 for the construction of approximately 5.5 miles of 12 kilovolt transmission line and a 600 KVA substation at its terminal end on the plant site. It was understood that the capacity of the transmission line should be not less than 1000 KVA.

On May 5, 1943, the transmission line and substation was placed in operation. Temporary transformer banks were erected in the TC Area for the furnishing of power. The transformer capacity in the TC Area was limited to 435 KVA. The transformer voltages were 2300 volt primary, 440/220 volt secondary with tap-off for 110 volt light power. Temporary power was provided to other parts of the plant by the use of manifold plug-in boxes which were located at advantageous points at the base of the power poles. The setting of unnecessary power poles was minimized by the installation of permanent pole lines which were erected prior to the furnishing of power by the Tennessee Valley Authority.

The original estimate of cost for the temporary construction work for this project was set up at \$174,160, which was sufficient for the scope of work known at the time. This figure was revised on August 6, 1943, to \$296,940 and further revised on December 17, 1943, to \$306,060, as shown in part IX COSTS. The scope of the work was almost two-fold, requiring additions to practically all shop and office buildings as well as increased facilities to take care of additional employees.


CLINTON ENGINEER WORKS
PROJECTS 9733 & 58
TEMPORARY CONSTRUCTION
BUILDINGS AND FACILITIES

<u>TC CHARGES</u>	<u>BLDG. & FACILITIES</u>	<u>DESCRIPTION</u>	<u>DATE STARTED</u>	<u>DATE COMPLETED</u>
TC-1	Repairs and remodeling, temporary partitions for construction offices	Repairing and remodeling town office	2/8/43	3/1/43
		Remodeling Scarborough School	2/15/43	3/15/43
		Partitions 703 Building	4/26/43	5/3/43
TC-3	Field Office for Division Engineers and Craft Superintendents	Wood frame 20' x 80' on mud sills, 9' eaves, gable roof, wood floor	2/9/43	4/15/43
	Division Engineer's Office 100 and 200 Areas	Wood frame on skids, 16' x 30', 8' eaves, gable roof	3/1/43	3/15/43
	Millwright Office 100 and 200 Areas	Wood frame on skids, 12' x 10', 8' eaves, gable roof	7/1/43	7/15/43
	Electrical Office 100 and 200 Areas	Wood frame on skids, 16' x 20', 8' eaves, gable roof	8/1/43	8/7/43
	Pipefitters' Storeroom & Office, 100 and 200 Areas	Wood frame on skids, 30' x 30', 8' eaves, shed roof	6/15/43	7/1/43
	Carpenter Office 100 and 200 Areas	Wood frame on skids, 16' x 20', 8' eaves, gable roof	6/1/43	6/15/43
	Concrete and Labor Field Office	Wood frame on skids, 22' x 12', 9' eaves, shed roof	5/1/43	5/10/43
TC-4	Stores and Tool Room	Wood frame 30' x 60', 9' eaves, gable roof	2/15/43	4/15/43
	Receiving Warehouse	Wood frame 30' x 60', 13' eaves, gable roof	2/15/43	5/15/43
	Electrical Storage Whse.	Wooden platform 30' x 60', covered by tent 30' x 60' (canvas)	8/2/43	8/5/43
	Receiving Office	Wood frame on skids 30' x 20', 8' eaves	7/12/43	7/17/43
	Equipment Storage Bldg.	Canvas tent 60' x 120'- Originally used to protect concrete 105 Bldg.	7/5/43 5/15/43	7/8/43 5/16/43



TC-6	Lumber Yard	500' x 200' and 300' x 200'	2/8/43	7/1/43
	Pipe Yard	100' x 150'	2/23/43	6/7/43
	Electrical	75' x 50' and 150' x 50'	2/16/43	6/7/43
	Steel Yard	100' x 75'	2/25/43	6/7/43
	Equipment Storage Yard	200' x 190'	3/18/43	3/25/43
	Construction Equip. Yard	150' x 250'	3/18/43	3/25/43
TC-7	Oxygen and Acetylene Storage Sheds	Three wood frame bldgs. 10' x 12', 12' eaves, shed roof	4/15/43	4/21/43
TC-3	Carpenter Shop and Office	Wood frame, 80' x 49', 10' eaves, lean-to and gable roof	2/16/43	5/1/43
		Last increase completed		7/1/43
	Panel Construction Platform	Wood platform 30' x 40', 4' high	3/14/43	3/16/43
	Saw Filing Shop	Remodeled existing 10' x 16' wood shed	4/1/43	4/7/43
	Hardware Storage Bldg.	Wood frame on skids 8' x 12', 8' eaves, gable roof	5/1/43	5/5/43
TC-9	Millwrights Shop & Office	Wood frame 56' x 103', 10' eaves, lean-to and gable roof	2/5/43	5/1/43
		Last increase completed		7/1/43
TC-12	Electric Shop & Office	Wood frame 20' x 42', 10' eaves, gable roof	2/16/43	4/1/43
		Last increase completed		5/1/43
TC-13	Paint & Sign Shop	Wood frame on skids 10' x 31', 8' eaves, gable roof	3/5/43	5/1/43
TC-14	Riggers Loft & Office	Wood frame 20' x 40', 8' eaves, gable roof	2/18/43	4/24/43
		Last increase completed		9/1/43
TC-15	Water	300' of 4", 2000' of 3", 1200' of 2"	4/15/43	10/1/43
	Steam	500' of 1 1/2", 4000' of 1" 400' of 3"	8/2/43	9/15/43

	Lights and Power	54 - 35' and 40' poles, 36 crossarms 12,000' #6 TWTF, 6000' #4 TWTF, 5000' #1/0 TWTF, 10,000' #4 BHDG, 20 lighting arrestors, and 20 primary cut-outs	3/15/43	9/15/43
	Telephone	Knoxville Office - 23 phones, Seabore Office - 3 phones Construction field offices-78 phones Single position switchboard install- ed Knoxville Office, and 2-position switchboard installed Field Office	2/7/43 3/15/43 4/7/43	2/15/43 3/17/43 10/1/43
	Air	600' of 3", 500' of 1"	8/15/43	10/1/43
TC-19	Garage	Wood frame 60' x 54', 10' eaves, gable and shed roof, concrete floor Last increase completed	2/26/43	5/1/43
	Grease Truck	Wood frame 30' x 20'	3/15/43	8/1/43 3/20/43
	Wash Truck	Wood frame 20' x 16', gable roof, concrete floor	8/7/43	8/16/43
	Storage Platform for Construction Equipment	Wood frame 30' x 30', 4' high	6/15/43	6/21/43
	Fuel Pumps	Two 1000-gallon tanks and 10-gallon hand pumps with 10-gallon bowl	3/15/43	4/1/43
	Dispatchers Booth	Wood frame on skids, 8' x 8', 7' eaves, shed roof	6/1/43	6/6/43
TC-21	Clock Alley	20 Alleys, wood frame 72' x 14', 8' eaves, gable roof Last increase completed	2/24/43	4/15/43
	Pay Booth	Wood frame on skids, 6' x 12', 8' eaves, shed roof	7/1/43	8/11/43 7/5/43
TC-22	Roads	7,500' of 20' road (#3 stone approx. 12" deep)	2/8/43	8/1/43
	Walks	6000' - 5' walks (6" stone & cinders)	3/1/43	8/1/43
	Fence	4000' wooden post and barbed wire fence 6' high	4/1/43	9/1/43

	Drainage Ditches	5000' - 3' wide, 2' deep	2/8/43	9/1/43
TC-23	Field Desks	70 wood desks 4' x 3' x 6'	2/8/43	8/1/43
	Tool Boxes	185 wood boxes 4' x 4' x 8', tar paper roof	2/8/43	8/1/43
	Work Benches	50 wooden benches, 3' x 3' x 10'	3/1/43	8/1/43
TC-25	Toilets	32 wood frame bldgs. on skids, 7' eaves, shed roof	3/1/43	8/15/43
TC-26	First Aid Station & Con- tractors Employment Office	Remodeled dwelling, an addition of room 10' x 10', 9' eaves, shed roof	2/25/43	4/1/43
TC-27	Construction Parking Lot	225' x 250', stone approx. 12' deep	2/16/43	3/15/43
	Compressor Station	200' x 300' 4' x 6' x 6' - Electric Driven	4/1/43 9/1/43	5/1/43 9/5/43
TC-28	Sentry Houses	8 wood frame bldgs. on skids, 6' x 6', 8' eaves, shed roof	4/15/43	9/15/43
TC-30	Pipe Shop & Office	Wooden frame, 50' x 80', 9' eaves, gable and shed roof	2/23/43	4/24/43
	Pickling Trough	Last increase completed Concrete trough, 5' x 4' x 20', 8" wall	6/30/43	6/15/43 9/4/43
TC-31	Sub-stations	1 bank, power 3-50KVA, 440/220 V 2 banks, power 3-25KVA, 440/220 V 2-50KVA, 1-25KVA, 2-5KVA lighting transformers, 220/110 V	4/1/43	6/1/43
TC-34	Pistol Range	2 Ranges, 20' x 150' (open)	8/1/43	8/15/43
TC-35	Leadburners Shop	Frame structure, 20' x 20', shed roof, 8' eaves	6/1/43	6/15/43
TC-44	Safety Building	Temporary partitions Bldg. 717-A	4/19/43	4/30/43

TC-47	Boiler	1-32 hp HRT boiler and facilities for(Honey Hill)	4/19/43	5/1/43
TC-49	Reinforcing Steel Yard	Remodeled 8' x 10' existing wood frame shed and 75' x 100' steel fabrication yard crushed stone 8" deep	3/1/43	4/1/43
TC-51	Ice House	Wood frame on skids, 13' 6" x 12', 10' eaves, shed roof	4/1/43	4/7/43
TC-52	Change House 101 Building	Wood frame on skids 32' x 20', gabled roof, 8' eaves	5/5/43	5/29/43
TC-53	Storage Building and Walkways - 101 Bldg.	2 wood frame buildings on mud sills, 30' x 96' & 30' x 90', gabled roof, 8' eaves. Wood frame passageways, 6' x 120', gabled shed roof, 8' eaves Last increase completed	4/15/43	5/1/43 6/15/43
TC-54	Construction Office 101 Building	Wood frame on skids, 16' x 36', gabled roof, 8' eaves Last increase completed	5/1/43	5/15/43 6/15/43
TC-55	Laundry - 101 Bldg.	Wood frame, concrete floor slab foundation, 16' x 24', gabled roof, 8' eaves	5/13/43	5/20/43
TC-56	Canteens	3 wood frame buildings on skids, 10' x 20', 8' eaves, shed roof	5/19/43	5/29/43
TC-57	Scarboro School Barracks Cafeteria Scarboro School Barracks Wood Storage Buildings	Remodeled Scarboro Sch. into a dormitory to house 280 workers Wood frame platform and siding, 40' x 70' covered by canvas tent roof 2 wood frame buildings on skids, 10' x 10', 8' eaves, shed roof	6/7/43 7/21/43 7/21/43	6/19/43 7/28/43 7/28/43

TC-58	Administration Building	Wood frame bldg. L shape, 125' x 35', L 75' x 35', 10' eaves, gable asphalt shingle roof, plumbing, heating, and ventilating facilities	6/7/43	8/15/43
	Vault	16' x 18', brick and concrete, 12" brick walls 10' high, flat roof	9/1/43	10/1/43
TC-59	First Aid Building	Wood frame wing, 41' x 35' added to Bldg. TC-58. Same type construction as above	8/2/43	9/15/43
TC-60	White Wing Ferry	Repairs to docking of ferry barge	7/15/43	7/21/43
TC-61	New Safety Building	Wood frame 45' x 31', 8' eaves, gable roof, concrete floor	7/17/43	8/2/43
TC-62	Oil Storage Shed	Wood frame on skids, 10' x 12', 8' eaves, shed roof	7/21/43	7/24/43
TC-63	Station Building	Wood frame on skids, 22' x 15', 8' eaves, gable roof	8/16/43	8/21/43
TC-64	Excess Material Office	Wood frame on skids, 20' x 15'	9/6/43	9/10/43
	Excess Storage Building	Wood platform covered by canvas tent, 30' x 60'	9/9/43	9/11/43
	Excess Material Yard	Barb wire fenced area, 180' x 70', one-half area covered with 8 inches of stone	9/9/43	9/25/43
TC-65	Stables	Remodeling barn to provide stables for 6 horses	9/23/43	9/28/43

Progress of Construction

1. Speed

(a) Construction Schedule

The Prime Contract W-7412 Eng.-23 for Projects 9733 and 58 at Clinton Engineer Works did not specify a definite start-up or completion date but only called for the completion of these projects at the earliest possible date.

On December 23, 1942, when the E. I. du Pont de Nemours & Company, (Inc.), entered into a letter contract with the United States Government, a start-up and final completion date was not established as it was impossible at that time to ascertain or to accurately estimate these dates. There were too many indeterminate factors; such as, the full scope of work to be performed, length of time required for experimental design, length of time required for experimental construction, and uncertain deliveries of special equipment and critical materials.

However, despite these unknown factors, a preliminary construction schedule for Project 9733 was drawn up on March 12, 1943, and is included under "Part VIII, -PLANNING AND SCHEDULING." This schedule was based upon a combination of the preliminary design schedule, meager procurement information, and an estimate of time required for building construction and equipment installation in view of the fact that only a small portion of 700 Area drawings had been received. Only three 100 & 200 Area Process Buildings, eight 500 & 600 Area Facilities and Outside Lines, nine 700 Area Service Buildings, and five 800 Area Service Buildings were included in this schedule as there was not sufficient design information at that time to schedule the entire scope of the work.

In the early part of the construction period, tentative dates for start-up and completion of the TNX Area were given the Government in a letter dated April 15, 1943, to the Corps of Engineers, Washington, D. C., from the Construction Division; quote: "Our present schedule indicates that the Clinton Engineer Works will be started September 1, to 15, 1943, and completed during the latter part of October, providing priorities are sufficiently high to provide materials of construction."

On April 12, 1943, the preliminary schedule was revised to include schedules for additional buildings and facilities and to include a Tentative Start-Up Date of August 1, 1943, and a Tentative Completion Date of September 30, 1943. These dates were set as a goal for the Field Construction Force to shoot at in view of day to day changes in the scope of the work and allowed approximately one month for contingencies. Nevertheless, the Field strove to keep and meet them regardless of their primitive settings. On June 1, 1943, the previously issued preliminary schedule was revised to include additional buildings and facilities and to change the Project Start-up Date to Sep-

tember 1, 1943. The completion date originally set was maintained. The ever-changing scope made it impossible to establish a firm Master Construction Schedule for Project 9733 during the early months of construction. From March 12, 1943, when the First Preliminary Construction Schedule was issued, to June 1, 1943, a total of 13 buildings and facilities were added to Project 9733. The scope of the work continued to mount steadily to July 1, 1943, when at that time the project had increased twofold. At this time, the work called for the construction of 58 buildings and facilities.

On July 12, 1943, there was established a new set of completion dates for the 100 and 200 Process Areas to compensate for the increased scope of the work and late delivery dates for limiting material and equipment. The new Start-Up Date set for the 100 Area was September 25, 1943, and Completion Date was October 25, 1943. The new Start-Up Date set for the 200 Area was October 10, 1943, and Completion Date was November 8, 1943. Due to the late receipt of design for control wiring by the Field for the 105 Building and the clarification of the picture and late deliveries of outstanding equipment required for start-up, revised start-up and completion dates were established.

The first work began in the 100 Process Area on March 23, 1943 when design for the 101 Building was released. A firm Start-Up Date of June 1, 1943 was set as this building was vitally needed for the field fabrication of material to be installed in the 105 Building. This date was met and operations began on May 27, 1943. Further design for the 100 Area was not released until the latter part of April. Work began on the 105 Building April 26, 1943.

The Area as a whole was substantially complete for start-up on October 16, 1943, and would have been complete with the exception of the installation of late orders not required for start-up. On this date, the 105 Building was turned over to Clinton Laboratories for test runs and preliminary start-up work. From that time until the actual production start-up of the building on November 11, 1943, final corrections and changes in design requested by the plant operators were made by construction. All uncompleted construction work due to the late deliveries of equipment was installed from November 28, 1943, to December 4, 1943, during a pre-arranged shut-down period. All work in this area was essentially complete as of this date.

Work began in the 200 Process Area on March 9, 1943 when mass excavation work was started for the 205 Building. On November 13, 1943, two weeks prior to the removal of all construction forces from the 205 Building, portions of the building and equipment were turned over to the plant operators in order for them to make tests and preliminary runs for the completed portion of the work. From November 13 to November 27, 1943 the majority of the time was spent in making design changes and corrections to design requested by the plant operators. The actual completion of all work for this building was 22 days beyond the

date previously established of November 6, 1943.

The 200 Process Area was substantially complete for start-up on November 27, 1943, with the exception of the partial completion of the 206 Tank Farm Area due to test failures of the 50' storage tanks which will be discussed later under "Construction Delays." All other storage tanks, retention basin, and cooling water ponds in the 206 Tank Farm Area were completed approximately seven to ten days prior to the completion of the 205 Building. The six 50' storage tanks were substantially complete for Start-Up on December 15, 1943, but all backfill, landscaping, and walks were not completed until the first of the year.

The 500 Area, composed of Outside Electric Lines and four Substations, was partially started up on July 15, 1943, and was essentially complete on September 30, 1943, with the exception of tying in Electrical Services to buildings of late authorization. No delays were encountered from the lack of Power and Lighting Services.

The Preliminary Master Construction Schedule dated April 12, 1943, carried a Start-Up Date of August 1, 1943, and a Completion Date of September 30, 1943, for the 600 Area - General Facilities and Outside Lines. Other facilities authorized by Design after this date carried the same start-up and completion dates of the buildings for which they served. A partial start-up of 600 Area Facilities was effected on July 1, 1943. By September 30, 1943, the 600 Area was substantially complete with the exception of White Oak Creek Dam which was a late authorization. Most of this work was completed well in advance of the needs of the Process and Service Areas.

The preliminary start-up dates set April 12, 1943, for the 700 Area Buildings known at that time varied from May 1, 1943, to August 1, 1943, depending on whether or not the building was to be occupied and used by Clinton Laboratories prior to the start-up of the Process Areas. Buildings and Facilities; such as, 701-A Clock Alley, 702 Telephones, 703 Administration Building, 707-A & B Shop and Supply House, and 719 First Aid and Hospital Building, were in this category. Other buildings were added to this list from time to time, including: 706-A Main Laboratory, 706-B Laboratory, 713-A General Storehouse, 717-B Special Machine Shop, 720 Patrol and Fire Headquarters, 724 Gas Station, 725 Garage, 726 Propane Gas Storage and Supply Lines, and 735 Training School.

The 700 Area buildings directly serving the Process Areas had the same start-up and completion dates as the areas which they served. The 706-A Main Laboratory Building was the largest and the most important 700 Area building and has been used as a basis for overall start-up of this Area. A close construction schedule was made for this building having the following start-up dates: East wing - August 15, 1943; Middle wing - September 1, 1943; and West wing - September 15, 1943.

The actual start-up for the east portion of the building was August 21, 1943, and the middle and west portions were started up by September 15, 1943. The only uncompleted items at that time consisted of turning over outstanding laboratory equipment when received and did not involve labor for installation.

Permanent construction work began in the 700 Area on February 23, 1943. The area as a whole was substantially complete for start-up on August 22, 1943. All construction efforts were concentrated on the 700 Area for the first two months while awaiting release of design for the Process Areas and the 800 Service Area. The 703-A - Administration Building was essentially complete for occupation on May 1, 1943, as scheduled. Other essential buildings followed in succession: 708 Cafeteria on July 24, 1943; 717-A Shop and Supply House on July 25, 1943; 717-B Special Machine Shop on August 1, 1943, and 719 First Aid and Hospital Building on the same date; and 724 and 725 Gas Station and Garage on August 15, 1943.

The schedules for several 700 Area Buildings were extended to include additions to existing structures, thus delaying the final completion of these buildings. Additions were added to the 701 Clock Alley, 702 Telephone System, 703 Administration Building, 708 Cafeteria, and 725 Garage. These changes are reflected by the revised Master Construction Schedule dated September 27, 1943, which is included in "Part VIII - PLANNING AND SCHEDULING."

The delay in the completion of 717-A Shop and Supply Storage Building also reflected by this schedule was due to the fact that some of the permanent shop equipment was used by the construction forces and could not be released until construction was essentially completed. Regardless of the fact that additional 700 Area buildings were added by design as late as October 5, 1943, all buildings with the exception of 720 Patrol and Fire Headquarters Building were in service prior to the start-up of the Process Areas.

On December 11, 1943, when Project 9733 had reached 98% complete, additional work requested by Clinton Laboratories amounting to approximately \$750,000 was authorized. This work consisted of constructing three new buildings and additions to five existing structures, as well as necessary 600 Area Facilities and Outside Lines. Partial design for these buildings was released on December 13, 1943, and work was started on the same day. A schedule for this work was prepared and a Tentative Start-Up and Completion Date of March 5, 1944, was set. All buildings were completed on schedule with the exception of the 708 Cafeteria Addition, which was delayed approximately one week due to late delivery on cafeteria equipment. This additional work caused an increase in the construction forces as du Pont was in the process of closing out construction when this additional work was authorized.

The tentative start-up dates for the 800 Service Area No. 2 were the same as those set for the 700 Service Area No. 1.

Major construction operations began in this area on March 15, 1943, when excavation began for 801 Boiler House Building. The only work done prior to this time was by subcontractors in the drilling of a drinking water well by the Layne-Central Company and the construction of a transmission power line and substation by the Tennessee Valley Authority. A partial start-up of this area was made on July 16, 1943, and consisted of the following buildings: 808 Reservoir, 805 Purchase Power, 814 River Pump House, 815 Overhead Water Storage Tank. Other buildings immediately followed in succession: 812 Reservoir Pump House on July 19, 1943; 813 Filter Plant on July 30, 1943; and 801 Boiler House on August 5, 1943. All work in this Area was essentially complete by August 31, 1943, with the exception of 807 Water Treatment House Building for which design had not been released until August 12, 1943. A partial start-up was effected on October 11, 1943, and was completed on December 25, 1943, with the exception of a few special valves which were installed later by Clinton Laboratories Maintenance Department.

Project 58 was added during the early part of May and Building 305 was scheduled for restriction and start of experimental work on July 8, 1943. A preliminary schedule for this work was prepared on June 11, 1943, having a Tentative Start-Up and Completion Date of September 30, 1943. Work on the building structure was begun on May 20, 1943, and was restricted on July 14, 1943.

The Tentative Construction Schedule for Project 58 was revised several times. The latest revised schedule, dated November 23, 1943, specified a Start-Up and Completion Date of January 5, 1944. It was impossible to establish a firm completion date at any time during construction as the nature of this work was purely experimental design and subject to unpredictable deliveries for specialized equipment. All experimental work originally outlined was completed by January 14, 1944. From this time to January 23, 1944, special experiments were conducted by representatives of the Wilmington Design Division and Technical Division. Upon completion of these experiments, a request was made for additional experimental construction. Design work was immediately commenced and orders were placed for additional material and equipment. A schedule for this work was made having in view the final completion of testing work by April 1, 1944. The additional experimental work was completed on March 9, 1943, and test runs were started approximately a week later upon receipt of special testing equipment from the Wilmington Shops.

(a) Recap of Speed

In order to determine the actual Physical Completion of Projects 9733 and 58 at any time prior to the inclusion of authorized additions in the scope of the work started on December 19, 1943, a vertical percentage scale has been added to the Wage and Hour Chart for du Pont and all Subcontractors, shown on page 198. By interpolating the curve for Accumulative Hours Expended by du Pont and all Subcontractors with this scale, the actual Physical Percent Complete can be determined at any time during construction. On December 11, 1943, Project 9733 was 98% complete and Project 58

was 85% complete. The TNX Area as a whole was 97% complete as of this date. With work continuing at the same diminishing rate, Project 9733 would have been completed by December 25, 1943, and Project 58 by January 6, 1944.

Listed below is the Physical Percent complete by months for projects 9733 and 58, as well as the Rate of Construction:

<u>MONTH</u> <u>ENDING</u>	<u>% PHYSICAL</u> <u>COMPLETE</u>	<u>RATE OF</u> <u>CONSTRUCTION</u>
January	00%	
February	01	01%
March	04	03
April	09	05
May	15	06
June	27	12
July	41	14
August	61	20
September	77	18
October	90	13
November	95	05
December 13	97	02

Permanent construction work progressed very slowly during the months of February, March, and April of 1943 as only a limited amount of design had been released and efforts were made to complete all temporary construction and to provide the plant site with necessary temporary construction facilities. At the end of April, the project as a whole was near 9% complete. From that time, a sharp increase in the rate of construction was noted and continued with increasing rate through the month of August. During the month of August, 20% of the work was completed. From this point on, the rate of construction began to diminish and, at the end of November, the project as a whole was 95% complete. The additional work, started on December 13, amounted to 6.6% of the combined total of work to be done; therefore, on this date, the overall percentage complete reverted to 90%.

Construction work for the TNX Area progressed in an orderly scheduled manner despite many delaying factors which were encountered during construction, such as lack of cohesion labor, high rate of labor turnover and absenteeism, experimental design construction, classified construction, ever-changing scope, late delivery

dates for special equipment and material, etc. These delaying factors and many others will be discussed in detail under "Part 2. - Delays." Every effort and expedient was employed to counteract these delays. The following steps were taken: shiftwork, increased daily working hours, Sunday work, awarded subcontractors, special expediting, field fabrication, etc., which will be discussed in detail under "Part 3 - Construction Expediency."

It might have been possible to have bettered the Start-Up Dates for the 100 and 200 Process Areas from four to six weeks if these major delays had not prevailed. It is doubted that further improvement could have been made as the nature and sequence of construction would not have permitted a closer construction schedule.

2. Construction Delay

(a) Lack of Common and Rated Labor

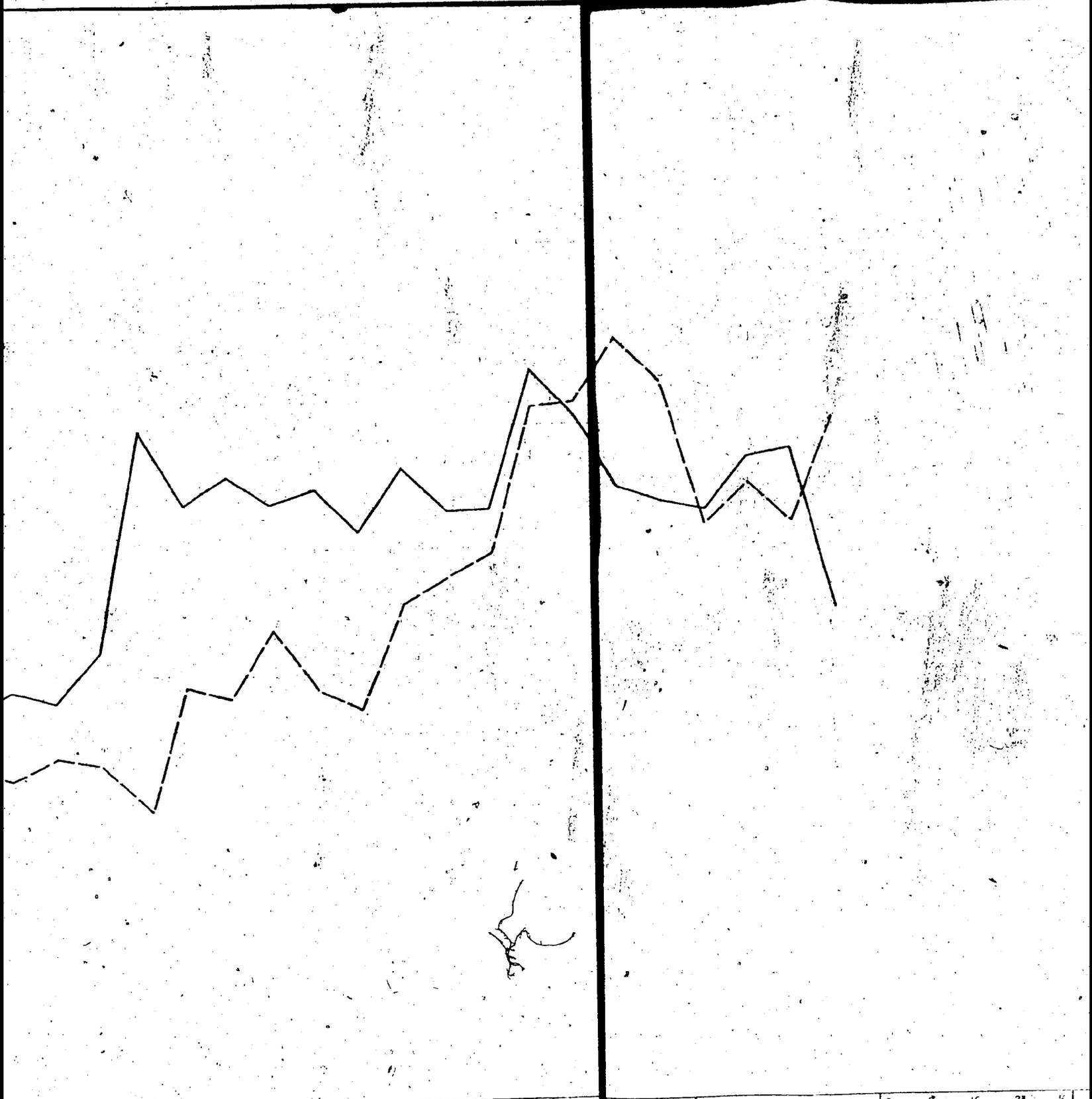
The acute shortage of both Common and Rated Labor was the largest contributing factor in the delay of construction for Project 9733 and 58 at Clinton Engineer Works. This shortage, however, was more prevalent for Common Labor than for the other classes of Rated Labor, which included Concrete Laborers, Carpenter Tenders, Mortar Mixers, Pipe Layers, and Air Tool Operators. This phase will be further discussed under "Part V, section (c) Recruitment of Labor."

At a meeting in General Groves' office on June 8, 1943, General Grove was presented with a letter from the Company relative to the schedule of the Clinton Engineer Works. This letter indicated that the project would be seriously delayed from a month to a month and a half owing to the fact that we had been unable to obtain necessary common labor to carry forward the work as speedily as equipment and drawings coming to the project. Colonel Barker, head of the Labor Relations Section, Corps of Engineers, confirmed that the du Pont Company had experienced the difficulty as cited with the War Commission and that we were now to recruit labor independently of groups in this agency.

By the aid of the Common and Rated Labor Schedule and Performance Chart on page 52 and tabulated sheet on the preceding page for same, we have endeavored to show graphically and statistically the acute shortage of Common and Rated Labor that prevailed on this job from April 17, 1943, up to and including week ending August 7, 1943. During this period, a total of 43,368 man days of labor work was scheduled by the Division Engineers and the Craft Superintendents of which the labor force was only capable of performing 32,060 man days of work, thereby causing the rescheduling of 10,808 man days of labor worked or 23.8% of all the labor work performed during this period. The average number of laborers working daily for this period was 235. By dividing the average number of men working daily into the total man days of work rescheduled, a delay in days for the project

CLINTON ENGINEER WORKS
PROJECTS 9733 & 58
SCHEDULE & PERFORMANCE
COMMON & RATED LABOR

WEEK ENDING	AVERAGE DAILY MAN DAYS				WEEKLY MAN DAYS	
	SCHEDULED	ON ROLL	WORKING	SHORT	RESCHEDULED	PERCENT RESCHEDULED
3/13/43	80	131	81	‡ 1	None	None
3/20	120	184	116	4	24	03
3/27	200	224	207	‡ 7	None	None
4/3	205	305	223	‡ 18	None	None
4/10	219	234	227	‡ 8	None	None
4/17	235	269	192	43	258	18.2
4/24	275	262	184	91	546	33.0
5/1	280	304	270	10	60	03.6
5/8	321	335	278	43	258	12.8
5/15	340	348	268	72	432	20.7
5/22	331	336	285	46	260	13.4
5/29	370	302	228	142	852	38.4
6/5	550	321	240	310	1860	56.4
6/12	488	415	341	147	882	30.1
6/19	510	447	331	179	1074	35.1
6/26	488	495	386	102	612	20.9
7/3	500	456	341	159	954	31.8
7/10	466	427	320	146	876	31.3
7/17	516	511	405	111	666	21.5
7/24	480	526	431	49	294	10.0
7/31	482	552	446	36	216	7.5
8/7	596	669	564	32	192	5.3
8/14	558	659	567	‡ 9	None	None
8/21	497	695	620	‡ 171	None	None
8/28	486	636	584	‡ 98	None	None
9/4	480	637	467	13	78	02.7
9/11	522	624	501	21	126	4.0
9/18	528	568	467	61	366	11.6
9/25	397	614	553	‡ 156	None	None
Total Man Days Scheduled 4/17 to 8/7					-	43,368
Total Man Days Work Performed 4/17 to 8/7					-	33,060
Total Man Days Work Rescheduled 4/17 to 8/7					-	10,308
Percent of Common and Rated Labor Work Rescheduled					-	23.8%
Average No. Men Working Daily 4/17 to 8/7					-	325
Total Days Delayed in Work 4/17 to 8/7					-	31.7
Notes: Carpenter Tenders not included in the above figures as this type of labor was split between Labor and Carpenter Craft.						



15 22 29 5 12 19 26 3 10 17 24 31 7 21 28 4 11 18 25 2 9 16 23
 MAY JUNE JULY SEPT. OCT

1943

SCHEDULE & PERFORMANCE
 COMMON & RATED LABOR
 CLINTON ENGINEER WORKS

as a whole can be evaluated. The delay computed on this basis was equal to 31.7 days against the completion of the project. This shortage not only delayed work performed by the Labor Craft but also hampered the work performed by the other crafts which were dependent upon the Labor Craft in most cases to initially perform certain phases of construction before work could be opened up for other crafts. This delay was also reflected in construction cost as a considerable shifting of crafts was required due to the lack of labor. Every effort was made by the Company to improve this condition and to obtain a sufficient force of Common and Rated labor to properly man the job. The full extent of their efforts will be discussed in detail later under this same section in "Part E Section 2 - Employment."

In the early part of April, at the request of the Management, a graph entitled Common Labor Curves was prepared by the Planning & Scheduling Department. The purpose of this graph was to establish a peak force of Common and Rated Labor required to complete all labor work by September 30, 1943. The peak period originally set was from July 1, 1943, to August 31, 1943, having an average force of 750 Common and Rated Laborers. The individual curves for Common and Rated Labor were likewise set to correspond with the overall curve. The Common Labor Curve for the same period averaged approximately 485 men and the Rated Labor Curve averaged 325. At the end of July, when it was estimated that the labor work on this project was from 4 to 5 weeks behind schedule, this graph was revised by increasing the overall curve from 750 to 850 men and extending it to September 31, 1943. From this point to December 1, 1943, it diminished in a straight line. The Rated Labor Curve was increased to a new peak of 525 men for September 31, 1943, as a greater portion of the remaining labor work was to be performed by Rated Labor. The Common Labor Curve was allowed to diminish from the peak previously established. The rate of decrease was checked and the curve was flattened for the last two months of construction. This graph was further revised in December to include additional authorized work for projects 9733 and 58. The graph indicated that a peak force of at least 125 men could be maintained up to February 29, 1944.

(b). Absenteeism.

The high rate of absenteeism that prevailed among the Manual du Pont and Manual Cost-Plus-A-Fixed-Fee Employees accounted for a total of 61,568 8-hour man days, which is equal to 13.35% of 8-hour man days expended by the above combined manual forces up to December 11, 1943, in the construction of this project.

The highest absentee rates were prevalent among the Common and Rated Laborers. The Common Labor Absentee Rate was 21.55% and the Rated Labor Absentee Rate was 21.35% for this period. These percentages accounted for 30,123 8-hour man days or approximately two-thirds of the time lost through absenteeism.

Individual craft absentee rates are shown on page E1, Data

800

700

600

500

400

300

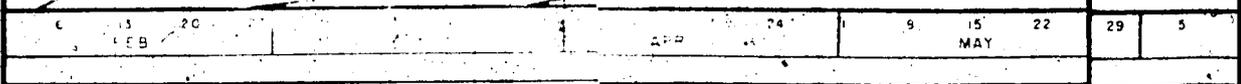
200

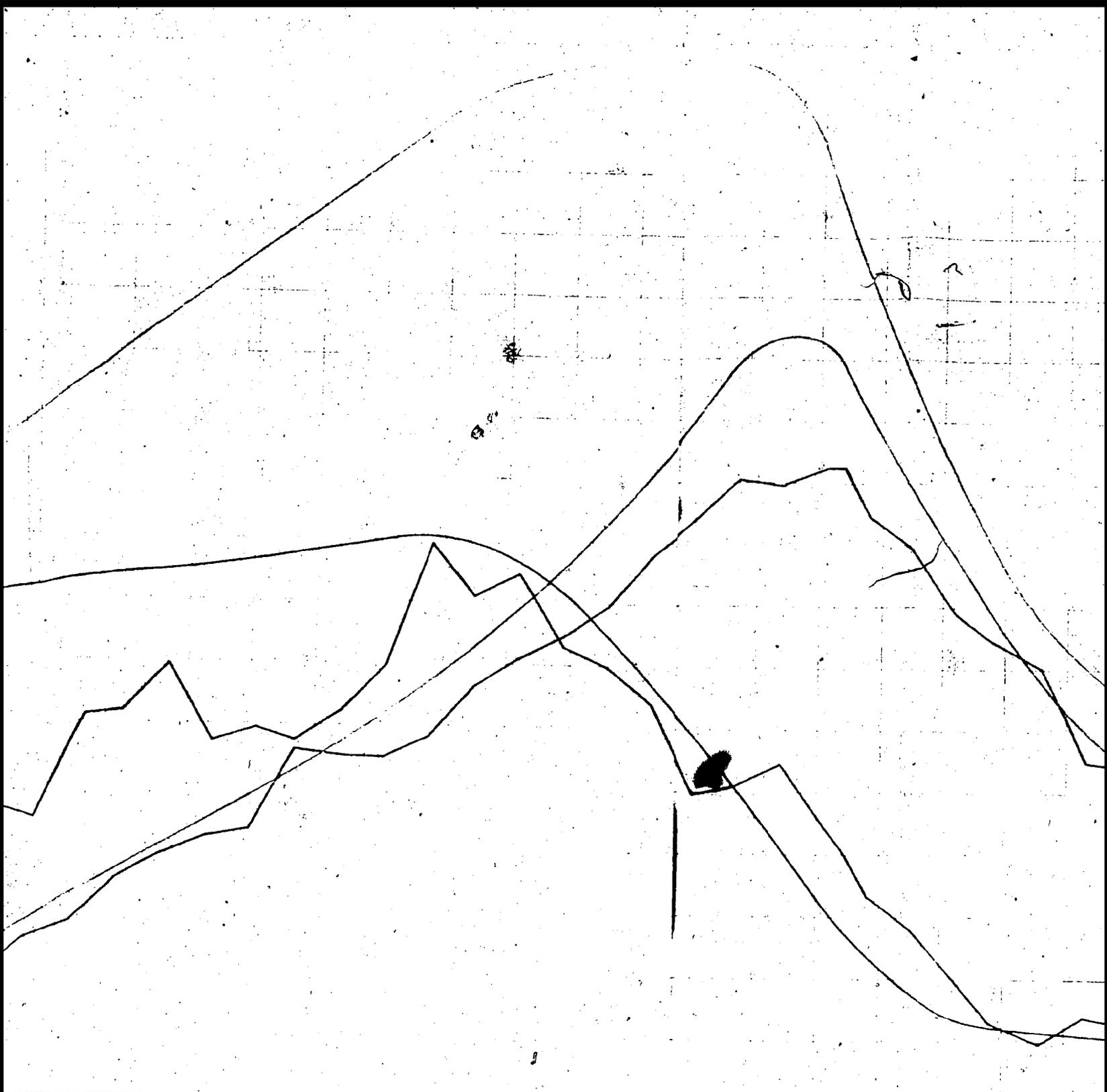
100

0

- ESTIMATED RATED COMMON LABOR REQ'D
- ===== ESTIMATED COMMON LABOR REQ'D
- ===== ACTUAL COMMON LABOR ON ROLL
- ESTIMATED RATED COMMON LABOR REQ'D
- ACTUAL RATED COMMON LABOR ON ROLL

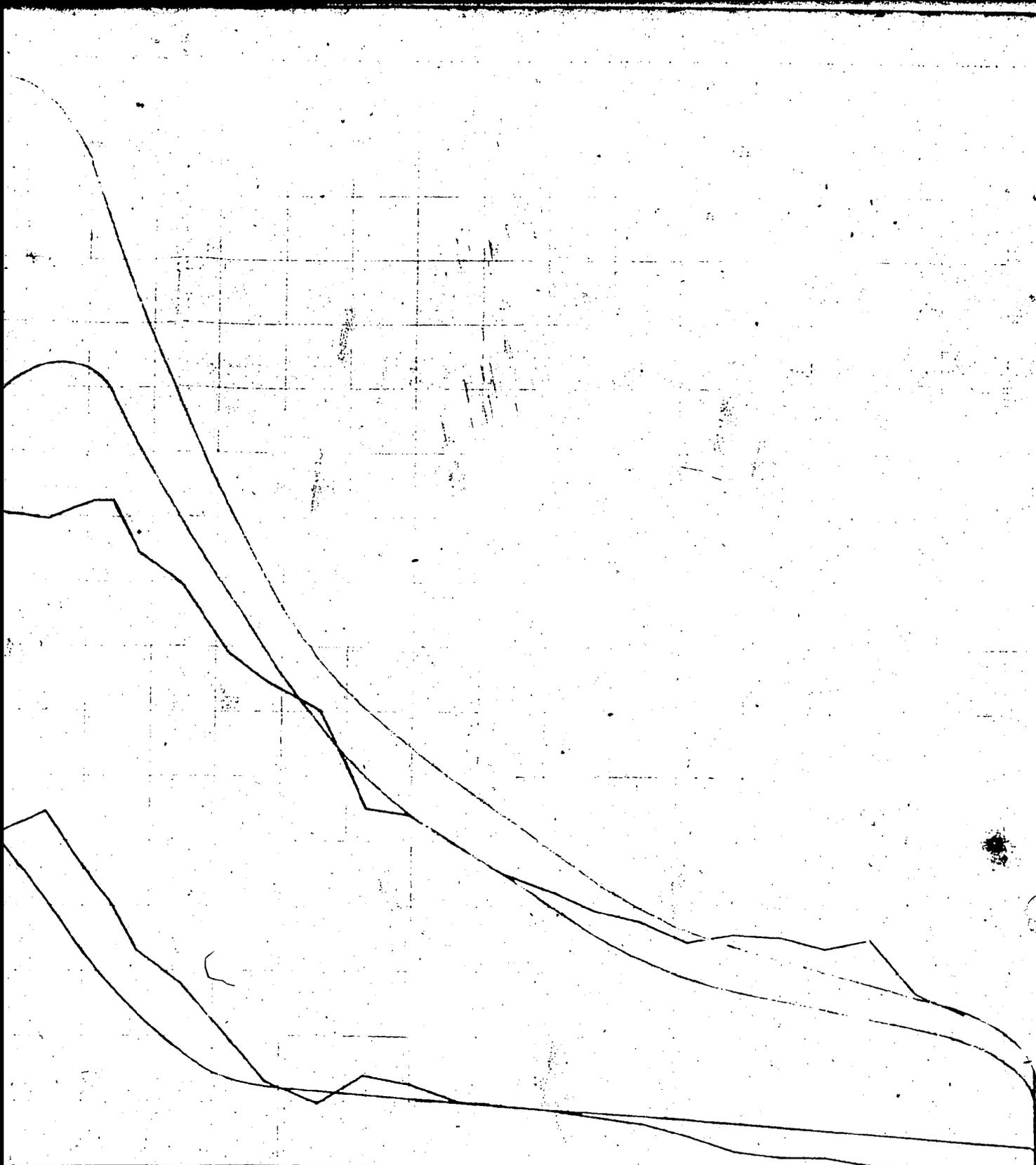
NOTE: RATED COMMON LABOR INCLUDES AIR TOOL OPERATORS, CARPENTERS, TENDERS, CONCRETE LABOR, MORTAR MIXERS, & PIPE LAYERS.





5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
JUNE				JULY				AUG.				SEPT				OCT				NOV				
1943																								

COMMON LABOR CURVES
 CLINTON ENGINEER WORKS.
 PROJECT 9733 & 58



2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	
OCT					NOV.					DEC					JAN				FEB			

1944

REVISED OCT 4, 1943.
REVISED DEC 13, 1943

on Working Personnel. Figures on Manual du Font and Cost-Plus-a-Fixed-Fee Subcontractors' employees are not available but the overtime work performed by this group would compensate for this loss. The overall absentee rate of 13.85% for the life of the job is approximately double the rate encountered on similar construction work by the Company. One-half of this percentage is equal to 6.92% or 25,782 8-hour man days of delayed work in the start-up and completion of this plant. By dividing the peak manual force (4020) of du Font and Cost-Plus-a-Fixed-Fee Subcontractors' employees into 25,782 8-hour man days of lost time, this delay can be evaluated at 1.7 days.

(c) Labor Turn-over

The amount of time lost by the excessive rate of labor turn-over on this job is an additional contributing factor to the delay of construction. The exact amount of time lost is indeterminate but an approximation can be made based on du Font's Labor and Labor Craft turn-over rates shown on the following page.

During the month of April, the turn-over rate took a sharp increase from 8% for the preceding month to 13% and continued to accelerate up to and including the month of August, when a peak of 35% was reached. From that time on, the turn-over diminished at approximately the same rate.

From February 1, 1943, to February 1, 1944, a total of 6,041 employees were placed on du Font's Local Wage Roll. Over this same period of time, there were 3615 quits and 239 discharges. The average monthly turn-over for the job was 24%. The labor craft was responsible for the high rate of turn-over on this job as it was approximately double the rate of the other crafts. It became necessary to employ 3222 laborers up to November 7, 1943, in order to attain a peak force of 773 men. The average weekly Common and Rated Labor Roll was 473 men up to week ending January 8, 1944.

The labor craft turn-over reached an all time high from week ending July 24 to week ending September 18. During this time, there were 1090 labor quits and discharges, averaging 120 men per week for this period. The average weekly quits and discharges of Common and Rated Labor through January 1, 1944, were 64 men, or an average weekly turn-over rate of 13.5%.

In addition to the loss of man-day's work in employment and termination of each laborer, an additional loss of time was encountered in the orientation and training of each new employee before he could adjust himself to the local construction conditions and regulations and become efficient in his work.

DUNSTON & BILLYE
 PROJECTS 3728 & 58
LABOR COST TURNOVER

Week ending	Workers on Roll	Total Suits & Discharges	Accumulative Suits & Discharges	Percentage of Turnover
to 3/27/43	255	34	34	13.3%
4/3	301	25	59	19.6%
4/10	325	11	70	21.5%
4/17	274	22	92	33.6%
4/24	257	21	113	43.9%
5/1	318	44	157	49.4%
5/8	336	40	197	58.6%
5/15	401	17	214	53.1%
5/22	339	32	246	72.6%
5/29	332	30	276	83.1%
6/5	358	17	293	81.3%
6/12	478	49	342	90.3%
6/19	506	94	436	86.2%
6/26	358	83	519	145.5%
7/3	516	119	637	123.1%
7/10	496	83	720	143.2%
7/17	368	85	805	156.1%
7/24	568	110	915	181.2%
7/31	612	97	1012	196.9%
8/7	736	189	1201	237.3%
8/14	735	138	1337	261.4%
8/21	778	104	1441	282.4%
8/28	741	149	1590	312.2%
9/4	747	97	1687	332.6%
9/11	731	104	1791	351.4%
9/18	317	104	1895	370.2%
9/25	750	87	1982	381.2%
10/2	770	59	2041	396.1%
10/9	735	97	2138	411.0%
10/16	340	74	2212	428.3%
10/23	587	58	2270	443.1%
10/30	497	71	2341	459.2%
11/6	429	87	2428	476.1%
11/13	398	43	2471	486.3%
11/20	248	21	2492	490.6%
11/27	255	19	2511	494.5%
12/4	299	32	2543	501.2%
12/11	274	20	2563	504.3%
12/18	287	16	2579	506.7%
12/25	255	22	2601	510.2%
1/1/44	198	16	2617	513.4%
1/8/44	192	18	2635	516.5%

AVERAGE WEEKLY ROLL FOR LIFE OF PROJECT - 472
 AVERAGE WEEKLY SUITS & DISCHARGES FOR LIFE OF PROJECT - 64
 AVERAGE WEEKLY TURNOVER - 13.5

CLINTON ENGINEER WORKS
 PROJECTS 9733 & 58
DU FONT LABOR TURNOVER

Month	Number on Roll First of Month	Hires	Quits	Discharges	Layoffs	Transfers	Number on Roll End of Month	Average Roll for Month	Percentage of Turnover
1943									
Jan.	0	10	0	0	0	0	10	10	0%
Feb.	10	286	9	0	1	0	286	148	6%
Mar.	286	555	41	5	4	2	789	537	8%
Apr.	789	413	114	8	1	0	1079	934	13%
May	1079	528	234	5	3	0	1465	1272	19%
June	1435	932	386	9	1	2	1999	1732	22%
July	1999	1056	674	24	5	3	2349	2174	32%
Aug.	2349	1219	843	34	81	0	2610	2479	35%
Sept.	2610	666	556	33	330	0	2807	2483	24%
Oct.	2357	167	427	57	390	20	1330	1843	26%
Nov.	1330	7	154	39	246	10	888	1109	17%
Dec.	888	27	112	17	125	17	644	766	17%
1944									
Jan.	644	65	65	8	30	7	599	622	12%
TOTALS -		6031	3615	239	1517	61			

AVERAGE MONTHLY ROLL THROUGH JANUARY 1944 - 1239
 AVERAGE MONTHLY QUILTS & DISCHARGES THROUGH JANUARY 1944 - 296
 AVERAGE MONTHLY TURNOVER THROUGH JANUARY 1944 - 24%

(d) Design

The construction work for the 100 & 200 Process Area Building and Equipment was based purely on experimental design. This accounts for partial delay in releasing final building design for the 105, 115, 205, and 206 Buildings and the late placing of orders for special equipment as the preparation of final drawing could not be started and quotation requested until pertinent experimental work had been completed.

Design work for the 100 & 200 Area Process Buildings was started on February 3, 1943, and was estimated in the Monthly Field Progress Report dated March 31, 1943, to be complete by June 15, 1943, and that design for all General Facilities, Outside Lines and Services in connection thereto and be completed no later than June 31, 1943. The dates on which design was received in the Field authorizing the start of work for major building construction is included in tabular form on page 68 entitled "Contract Excavation and Labor Progress."

Design for Project 58 was started on May 7, 1943, and it was originally estimated to be complete by July 15, 1943. The design work originally contemplated for the first group of experiments was 100% complete on August 1, 1943. Due to additional experiments, however, the design work for Project 58 was not fully completed until March 3, 1944.

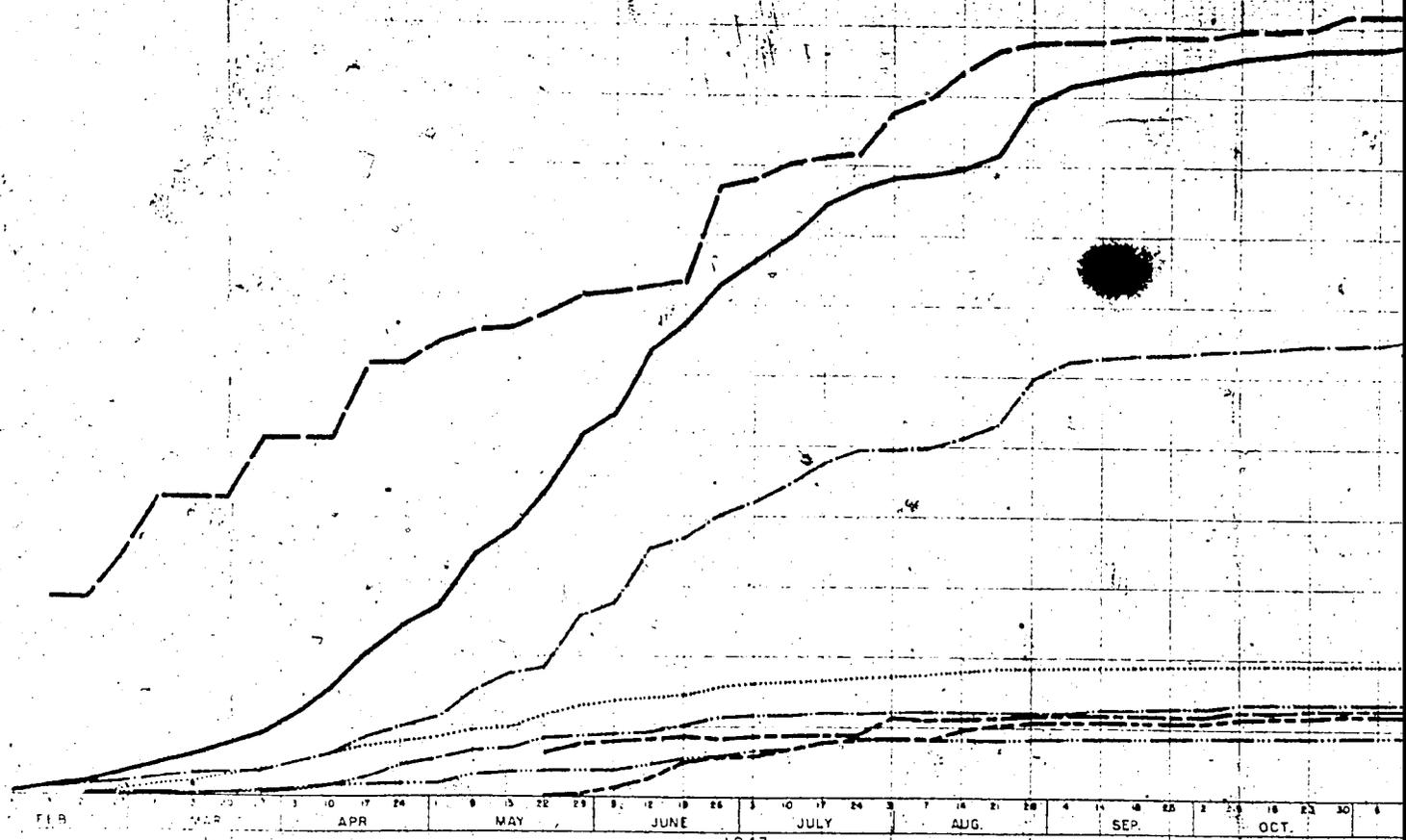
The ever-changing scope of design work for Projects 9733 and 58 was an additional hardship on both the Design Division and the Field Forces. From the Design Status Graph shown on the following page, it was originally estimated that the total drawings for Project 9733 would be approximately 280 and that the total drawings for Project 58 would be approximately 75. The first drawing for Project 9733 was issued on February 6, 1943, and design followed at the rate of 15 drawings per week for the first 8 weeks. At this time, the rate of design release increased to the rate of 48 drawings per week for the succeeding 15 weeks. The original estimate of 280 drawings for Project 9733 was reached on April 3, 1943. A total of approximately 1147 drawings was issued for Project 9733. Of this total, 827 were Process, 142 were Power, 100 were Electrical, and 178 were Civil and Architectural.

The first drawings for Project 58 were issued on May 22, 1943, and design followed at the rate of approximately 9 drawings per week for the succeeding 3 weeks. The original estimated drawings for Project 58 was reached on July 17, 1943; however, the issuing of drawings continued until the end of construction. A total of approximately 149 drawings was found to have been issued, doubling the number of drawings originally estimated. Of this total, 142 were Process, 1 was Power, 2 were Electrical, and 4 were Civil and Architectural.

Had the full extent of the work been known at the beginning of the project, all of the Civil and Architectural drawings could

LEGEND

- ESTIMATED TOTAL DRAWINGS FOR PROJ. 9733 
- TOTAL DRAWINGS ISSUED FOR PROJECT 9733 
- PROJECT DRAWINGS ISSUED FOR PROJ. 9733 
- ELECTRICAL DRAWINGS ISSUED FOR PROJECT 9733 
- ELECTRICAL DRAWINGS ISSUED FOR PROJ. 9733 
- BUILDING DRAWINGS ISSUED FOR PROJ. 9733 
- ESTIMATED TOTAL DRAWINGS FOR PROJ. 58 
- TOTAL DRAWINGS ISSUED FOR PROJECT 58 

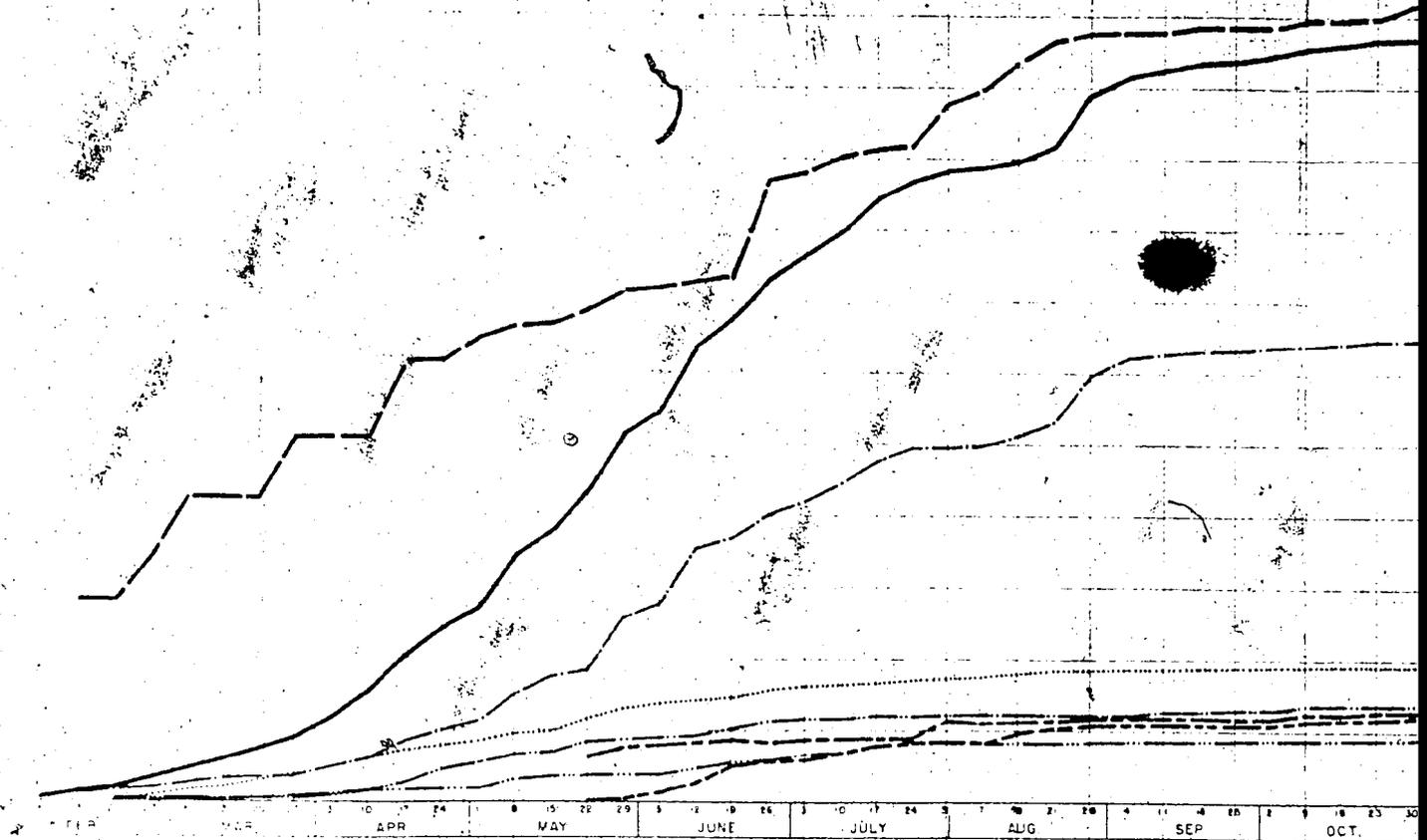


DESIGN STATUS

CLINTON ENGINEER WORKS
PROJECTS - 9733 & 58

LEGEND

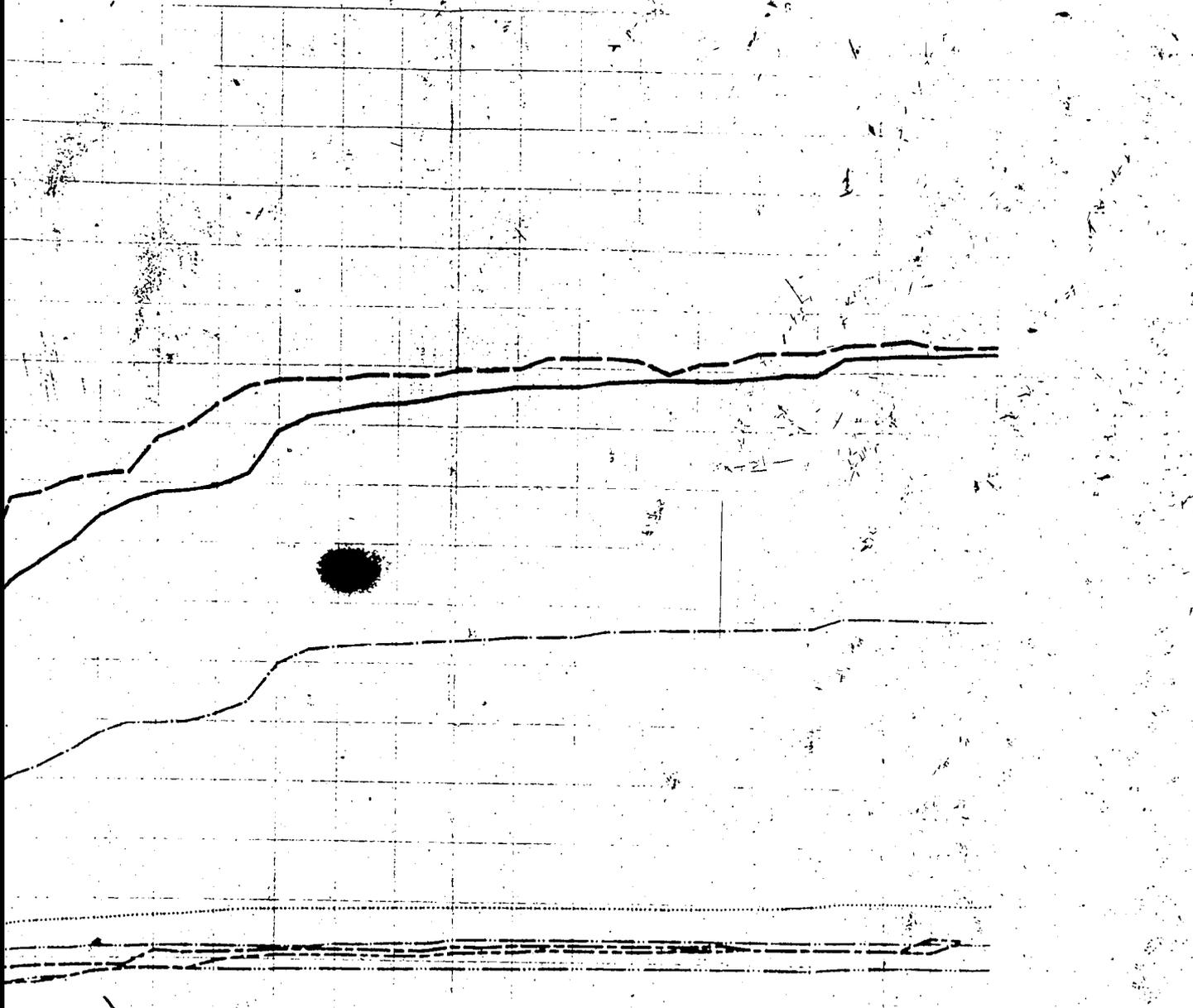
- ESTIMATED TOTAL DRAWINGS FOR PROJ. 9733
- TOTAL DRAWINGS ISSUED FOR PROJECT 9733
- PROJ. 9733 DRAWINGS ISSUED FOR PROJ. 9733
- MECHANICAL DRAWINGS ISSUED FOR PROJECT 9733
- ELECTRICAL DRAWINGS ISSUED FOR PROJ. 9733
- BUILDING DRAWINGS ISSUED FOR PROJ. 9733
- ESTIMATED TOTAL DRAWINGS FOR PROJ. 58
- TOTAL DRAWINGS ISSUED FOR PROJECT 58



DESIGN STATUS

GLINTON ENGINEER WORKS

PROJECTS - 9733 & 58



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JULY			AUG.				SEP.					OCT.					NOV.					DEC.					JAN.			FEB.			MAR.																												
1943																																		1944																											

DESIGN STATUS
 CLINTON ENGINEER WORKS
 PROJECTS - 9733 & 58

have been prepared at one time and mass machine excavation work could have been done.

The design of the 100 and 200 Area Process Buildings was of massive concrete construction and required the work to be performed in pyramid order. Despite the massiveness of the work, a high degree of precision was required as hundreds of sleeves, openings, and inserts were required to be set to very close tolerance. The electrical and mechanical control systems in the 105 and 205 Buildings required expert workmanship and high caliber supervision as the majority of this work was a radical departure from normal industrial construction.

The work on this project, especially in the Process Areas, was further delayed due to the classified nature of the work. Full advantage of construction experience and planning could not be extracted from the foremen and workmen as they were unable to comprehend the full extent of the work in which they were performing as the explanation of the work and the use of the classified drawings were confined to the higher branches of supervision. Further time was lost in checking men and materials in and out of restricted areas. Once an area had been restricted, only cleared personnel was permitted to work in that area, thereby losing flexibility of all available construction forces.

(e) Lack of Construction Facilities

The plant site lacked necessary temporary construction facilities. These had to be provided prior to starting permanent construction and accounted for the small amount of progress made during the first three months of construction. The TNX site was completely lacking of electric power, drinking water, telephone, railroads, adequate access roads, commuting facilities, and office and material storage space.

The long haul from the nearest rail siding at Byington, Tennessee, presented a delay in unloading and transporting rail shipments to the plant site. This siding was limited to 10 cars and, on several occasions, car loadings were held in Knoxville pending available space at Byington. Even though the access roads were available in due course of time, the Company was delayed by the unavailability of the subcontractor's equipment for the transportation of all rail shipments to the plant site. The long haul of 15 miles per round trip plus time for loading and unloading would not permit many daily trips for each vehicle. The size of the project did not warrant the expense of providing rail facilities to the plant site.

(f) Construction Materials

The start-up and completion dates for the 100 & 200 Areas, the 807 Water Treatment House, as well as a part of the 700 Area Buildings, could have been improved somewhat if there had been for the late delivery of limiting start-up equip-

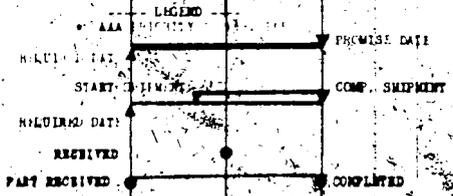
struction materials. The extent to which the start-up dates could have been bettered is debatable. The amount of delay involved is best reflected by the Critical Order Charts for these areas which are included herein. These charts were currently revised from time to time to include the latest promise dates offered by the vendors which were plotted against the date for which the material would be required by the Field for installation. The actual date on which the material was received in the Field has been indicated on the original charts by using a dot symbol for date received on the same line as inverted indicating latest promise date estimated by the vendor.

On July 26, 1943, two months prior to the tentative start-up date established for the 100 Area, the critical order list for that area contained twenty-five half number purchase orders, of which twenty-one had promise dates beyond the August 31, 1943, deadline delivery date set for limiting equipment. Of this number, only two of these orders were for the 115 Building and the balance was for the 105 Building. The critical orders for the 115 Building consisted of instruments and special electrical control equipment.

The late deliveries of the following list of construction material contributed to the delay in the start-up and completion of the 105 Building: oil-draulic system and controls, rod mechanisms, charging elevator, charging mechanisms, overhead crane, scanning device, pneumatic conveyor, optical device, bayonet heaters, mattress plates, and miscellaneous instruments and electrical controls. Had this material been on the plant site by October 1, 1943, all work in the 105 Building could have been completed by the 16th of that month, thus eliminating the shut-down period from November 27, 1943, to December 5, 1943, and bettering the final completion date of the building from December 5, 1943, to the preliminary start-up date of October 16, 1943. Further delay was encountered due to an error in the fabrication of the original set of mattress plates and the change in specifications for a different grade of "Neoprene" for the fabrication of the second set of plate. The operating department delayed the production start-up of the 105 Building in order for the second set to be installed rather than the original set. Also, due to an error in the fabrication of charging tubes by the vendor which required approximately one week's time to hand ream in place.

The late delivery of fabricated stainless steel 25-12 CB equipment was the largest contributing factor in the failure to meet the tentative start-up and completion date set for the 205 Separation Building. The initial delay was encountered in the procurement of stainless steel 25-12 CB by the Company and furnishing the vendors with necessary stock to proceed with the fabrication of special equipment; such as, centrifuges, precipitators, agitators, tanks, syphons, tubing, valves, condensers, and miscellaneous assemblies. The Company acted as a procurement agency and placed joint purchase orders with Allegheny-Ludlum Steel Company, Carpenter Steel Company, and G. O. Carlson for 97 tons of stainless steel 25-12 CB and approximately 9 tons of stainless steel 18-8 CB for this project. Despite the early placing of these

FIG. NO.	DESCRIPTION	MATERIAL	QTY	WARM	SOURCE	REMARKS	START DATE	COMPL. DATE
FIG. 1004	STEEL & ALUMINUM	AAA	4	WARM	MATERIAL FROM FIG 434, FIG 334			
FIG. 1005	W.M. H. HASKELL MFG. CO.	AAA	4	WARM	MATERIAL FROM FIG 424			
FIG. 1006	IRON FURNACE & IRON	AA-2X	4	WARM	MATERIAL FROM FIG 104			
FIG. 1007	IRON FURNACE & IRON	AAA	5	WARM	MATERIAL FROM FIG 424, FIG 434, FIG 334			
FIG. 1008	SMELT & FILTER INC.	AAA	8	WARM	MATERIAL FROM FIG 424, FIG 434, FIG 104, FIG 334			
FIG. 1009	IRON FURNACE & IRON	AAA	5	WARM	MATERIAL FROM FIG 424			
FIG. 1010	CARPENTER STEEL CO.	AA-2X	4 TO 6	WARM	MATERIAL FROM ALLEGHENY LUDLOW ON P.O. 7079-L & P.O. 7078-L			
FIG. 1011	W.M. H. HASKELL MFG. CO.	AA-2X	3	SCHL. FOR 7-26	MATERIAL PURCHASED FROM G.O. CARLSON ON HASKELL ORDER			
FIG. 1012	SCHMIDT & FOLGER MFG. CO.	AAA	8	WARM	MATERIAL FROM FIG 424			
FIG. 1013	CARPENTER STEEL CO.	AA-2X	4	WARM	MATERIAL FROM ALLEGHENY LUDLOW ON P.O. 6991-L			
FIG. 1014	LEUNG & WORTHROP	AAA	3	SCHL. FOR 7-22	AFTER RECEIPT OF MATERIAL ON 424			
FIG. 1015	CRUCIBLE STEEL CO.	AA-2X			BASIC MATERIAL FOR FIG ORDERS: 14, 24, 54, 34, 154, 159, 174, 184, 204, 204, 234, 244, 254, 214, 264, 284, 294, 304, 324, 334, 544, 644			
FIG. 1016	AMERICAN CHAIN & CABLE CO.	AA-2X	2	WARM	MATERIAL FROM ALLEGHENY LUDLOW ON FIG 334			
FIG. 1017	IRON FURNACE & IRON	AA-2X	4	WARM	MATERIAL FROM ALLEGHENY LUDLOW ON FIG 334, FIG 300134			
FIG. 1018	LIBERTY COILERS-SMITH CO.	AA-2X	4	WARM	MATERIAL FROM FIG 304			
FIG. 1019	IRON FURNACE & IRON	AA-2X	6	WARM	MATERIAL FROM FIG 434, FIG 334			
FIG. 1020	SCHMIDT & FOLGER MFG. CO.	AA-2X	8	WARM, 2 WARM WITH AAA TRIGRITY	MATERIAL FROM FIG 424			
FIG. 1021	STEEL & ALUMINUM	AA-2X	3	WARM	MATERIAL FROM FIG 334			



1-20-44

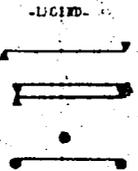
orders, the schedule for the rolling of the plate and tubing was delayed due to the low priority rating of AA-2X established for this project at the beginning of construction.

On July 28, 1943, two months and twelve days prior to the tentative start-up date set for Building 305, the critical order list for this building contained 43 half number purchase orders of which 28 had promise dates beyond August 31, 1943, deadline delivery date set for limiting start-up equipment. Every critical half number order on this list was dependent on the early receipt of 25-12 CR and 18-8 CR stainless steel plate and tubing as all promise delivery dates were based on so many weeks after the receipt of this material. The cells and the control room were complete for equipment approximately four to five weeks prior to the receipt of the first group of equipment. This is confirmed by the detail Construction Schedule for Building 305. Other innumerable delays were encountered during the erection of the equipment; such as a late revisions of the piping arrangement and the fabrication of this piping which had to be sent to Chattanooga, Tennessee, for heat treating after welding, ordering and replacing speed reduction gears, changing size of agitators, motor, etc.

The speedy completion of the experimental construction work for Project 58 at Clinton Engineer Works was dependent on the early receipt of construction materials and equipment in the field and the receipt of these materials in proper sequence as outlined in the construction schedule established for this work. From the detail Construction Schedule for Building 305, we find that the building structure was wholly complete by July 30, 1943, and it would have been possible to have started the installation of necessary machinery for the machining of carbon blocks two weeks prior to this time; however, due to the late delivery of this equipment, the installation of these machines was delayed until week ending August 14, 1943. From this time on to September 4, 1943, time was devoted to machine development. The critical outstanding late orders for Building 305 were the biological shield, stainless steel fittings and tubing, special castings, tube sheets and heat plates, and cast iron base blocks. On August 30, 1943, two months before the start-up and completion date set for the 305 Building, the critical order list for this building contained nine half number purchase orders, of which four had promise dates beyond September 10, deadline delivery date for limiting equipment, and two others were listed as indefinite. Still later, on October 14, 1943, there were seven outstanding half number purchase orders necessary for the start-up and completion of Building 305. The time required to complete original experiments could have been reduced from two to three months had it not been for the delays in receipt of the above list of material and equipment. Approximately three weeks' delay was encountered in additional experimental work due to late delivery of bellows, nozzles, and charging machine.

Only on a few occasions during the construction was the du Pont Company able to obtain its requested daily quota of crushed stone vitally necessary for the construction of temporary and

REMOVED DATE
START PAYMENT
REMOVED DATE
REMOVED
PART RECEIVED



PROMISE DATE
COMPLETE PAYMENT
COMPLETE

REMOVED DATE

PAY - BY DATE

ADJUNCT NO.
1943

permanent plant roads, as the plant quarry operated by another prime contractor was unable to meet the total tonnage requirements of all the Prime Contractors at Clinton Engineer Works, there being five prime contractors on the reservation. To partially alleviate this condition approximately 10,000 tons of crushed stone was purchased from the Cameron Bros. quarry located at Selway, Tennessee, approximately twelve miles distant from the plant site. This purchase was at an increase rate to supplement the additional hauling distance and had the approval of the Area Engineer.

(g) Miscellaneous Delays

Additional rock excavation over and above that originally anticipated, amounting to approximately 5,000 cubic yards, was encountered in the excavation of Main Process Buildings and Underground Lines, which further delayed the building and equipment foundations in those areas. Part of this was due to the inclined rock strata encountered on the plant site. Rock encountered in late excavation work and in crowded construction areas had to be removed by hand as blasting was restricted under those conditions. The Albert Bros. Contractors, Inc., excavation subcontractors for this job, was unable to immediately begin authorized construction work released by Design as indicated on tabular sheet entitled "Contract Excavation and Labor Progress" on the following page. This condition arose due to the fact that the contractor was unable to provide an adequate list of excavation equipment on this job and later, as this condition became more evident, was required to rent necessary excavating equipment to eliminate further delay. A portion of the contractor's equipment was tied up on other construction jobs. The contractor also experienced delays as he was unable to obtain experienced operators and mechanics locally. Considerable delay was brought about due to the inability to purchase major construction equipment and shop tools as this was prohibited by the government and were required to obtain equipment of this type through government transfers from other war construction projects; however, rentals were encouraged by the Area Engineer but, because of recapture provisions, the available rental supply was limited. The equipment acquired through transfers was, in most cases, outdated and not in the best mechanical condition. Replaceable parts for this equipment could not be obtained for some period of time. At this time, newer used construction equipment was being collected by the government for military purposes.

The main reasons for the delay in the start-up and completion of the 200 Underground Tank Farm were the failure of the suspended "Gunitite" domes to meet a 5000 lb. per sq. inch tensile strength at 28 days and the additional membraning and linings added to the 25' and 50' storage tanks by the Design Division for further protection against leakage. It was also noted in the cores taken by the Pittsburgh Testing Laboratory that the tops were laminated with sand seams between the "Gunitite" layers. This was due to improper cleaning by the contractor prior to applying additional coats of "Gunitite" cement. The contractor, at no cost

CLINTON ENGINEER WORKS
PROJECTS 9733 & 58
CONTRACT EXCAVATION & LABOR PROGRESS

Bldg.	Description Bldg.	Date Drawings Received	Date Contract		Date Hand Labor		Remarks
			Exc. Start	Exc. Comp.	Started	Completed	
101	Process Bldg.	2/23/43	3/23/43	3/23/43	3/24/43	7/10/43	Hold on bldg. fda. re-leased 3/23/43
105	Process Bldg.	4/16/43	4/26/43	5/11/43	5/10/43	10/15/43	Lack exc., equipt. and labor
115	Process Bldg.	4/10/43	4/16/43	5/15/43	5/17/43	10/15/43	Lack exc., equipt. and labor
205	Process Bldg.	2/15/43	3/9/43	4/20/43	4/15/43	10/30/43	Contract equipt. not available until 3/9/43
206	Process Bldg.	4/6/43	3/18/43	6/20/43	4/1/43	1/1/44	Lack exc. equipt.
603	Roads & Walks	2/6/43	2/10/43	12/1/43	2/10/43	2/15/44	Lack labor for drainage structures & ditches
623	Underground Water	3/16/43	3/31/43	12/1/43	4/2/43	2/15/44	Lack labor & equipt.
625	Sewers & Septic Tanks	3/30/43	4/15/43	12/1/43	4/29/43	2/10/44	Lack labor and equipt.
630	Fire Protection	3/29/43	4/17/43	12/1/43	5/7/43	2/10/44	Lack labor and equipt.
631	Pipe Support	4/17/43	NONE	NONE	6/1/43	2/10/44	Lack labor
706-A	Main Laboratory	4/22/43	5/5/43	5/15/43	5/10/43	9/15/43	Lack labor
706-B	Laboratory	5/19/43	6/14/43	6/16/43	6/17/43	10/15/43	Lack labor
719	First Aid	4/9/43	4/10/43	4/12-43	4/12/43	8/1/43	Lack labor
801	Boiler House	3/11/43	3/15/43	3/31/43	3/25/43	8/15/43	Lack labor and equipt.
812	Reservoir Pump House	4/16/43	NONE	NONE	5/18/43	7/10/43	Lack labor
813	Filter Plant	4/17/43	4/21/43	4/22/43	4/29/43	9/1/43	Lack labor
814	River Pump House	3/30/43	4/5/43	5/24/43	5/27/43	7/16/43	Lack equipt., and labor

to du Pont, placed additional suspended domes 5" thick on all 50' tanks. Had it not been for the additional tops, the 208 Tank Farm would have been completed on November 1, 1943, six days prior to completion date set for the 208 Area.

2. Construction Expediency

In order to compensate for the many delaying factors listed in the preceding section, "Construction Delays," every expedient was employed by the Company to overcome the time lost through these delays and to alleviate ever-present obstructing conditions.

(a) Extended Working Hours

On March 19, 1943, the Company obtained approval from the Area Engineer to work the labor craft six days per week ten hours per day, Monday through Saturday, in order to rush construction on items which were falling behind schedule due to the lack of necessary manpower. The craft began working on this extended work week on March 22, 1943. The ten-hour day was specifically adopted to obtain additional man hours needed as a result of manpower shortage in this craft. On May 31, 1943, all crafts assumed a 58-hour work week. From the data sheet on Working Personnel shown on page 151, a total of 51,107 additional 8-hour man days of Manual du Pont and Cost-Plus-a-Fixed-Fee subcontractors' work was accomplished by the use of the extended work week through December 11, 1943.

(b) Shift Work

On the same date that all crafts assumed a 58-hour work week, multiple shift work was begun on a two 10-hour day shift basis. In the transition from single shift work to multiple shift work, the manual force was increased approximately one-third, thereby reducing the over-all construction period by the same amount. The working space in the Process Areas would not efficiently permit the doubling up of forces on single shift work. Multiple shift work was continued until December 4, 1943, at which time it was temporarily suspended and construction work proceeded on a single day shift. Multiple shift work was again resumed on January 10, 1944, and continued until February 13, 1944, in order to speed up the completion of the additional work for this project. The best results in shift work were obtained on continuous construction work which had to be performed in sequence, such as the pyramid form of construction in the Main Process Buildings.

(c) Sunday Work

Sunday work was resorted to about the same time when multiple shift work began. All service shutdowns and tie-ins affecting construction and plant operation were performed on Sundays to eliminate all possibilities of delaying construction work. All Sunday work had to be approved by the Area Engineer. Engineering supervision was maintained for all Sunday work by the rotation of this assignment weekly among the Division Engineers and other engineer-

ing supervision. A minimum construction force was used on Sundays and work was only performed that was behind schedule or delaying the start-up of essential buildings or work that was delaying other crafts.

(d) Protection

Noteworthy was the precaution taken by the Field against the unpredictable weather conditions which might delay work for the 105 Building and equipment foundations. A canvas tent 60' x 120' was erected as soon as mass excavation work was completed. Pictures illustrating this added precaution is included under "Part VII CONSTRUCTION." The tent was not removed until this work was well out of the ground.

(e) Subcontracts

Subcontracts were awarded to certain phases of construction work on this project for the following reasons: to speed up construction, to obtain labor and specialized supervision, to eliminate delays in the procurement of special construction equipment, to make use of extensive organization and personnel of specialized contractors, and to complete each phase of work in the shortest possible time.

(f) Additional Equipment

When the Transit Mix Corporation announced that they would be unable to use their five-cubic yard trucks in transporting ready-mix concrete to the TNX Area because of the impossible condition of the plant entrance road and the lack of heavy base temporary roads within the plant site, the Company immediately set about to remedy this condition through the purchase of a fleet of two-cubic yard light weight concrete mixer trucks. Within ten days of this notice, a fleet consisting of eighteen trucks was obtained by Government Transfer from the St. Louis District Corps of the United States Engineers and was driven through to save shipping time. A 105-ton triple bin concrete batch plant was rented from Wilson, Weisner & Wilkinson Company of Knoxville, Tennessee, and erected on the plant site to expedite the preparation and placing of special concrete for the 105 Building. Other equipment, such as cranes, air compressors, and excavating equipment, was rented from time to time to speed up the lagging items of construction. For further information, see Rental Equipment List under "Part V, Section J - Major Construction Equipment."

(g) Used and Excess Materials and Equipment

The purchase of used equipment, which if purchased new would have required months of fabrication, made it possible for the early start-up of the 801 Boiler House Building and the 815 Fire Protection System. Two used 530 H.P. single set Walsh & Weidner, cross drum type, water tube boilers, complete with all pertinent equipment, were obtained from the Salvage and Reclamation Division of the Company. These boilers were located in a near-by

plant in the vicinity of Nashville, Tennessee. A secondhand 50,000 gallon elevated two-section hemispherical steel storage tank was procured, dismantled, transported, and re-erected in record time. Critical material and equipment having long deliveries on the open market were often readily obtained from the excess of other Government Projects. The full extent of this type of procurement is discussed under "Part V, Section I Material."

(h) Field Fabrication

One of the outstanding achievements made by the construction force was the rapidity in the field fabrication of carbon blocks for the Pile and short time required for final assembly. Certain machine development by the Field and the adoption of assembly line methods were responsible for the speed developed in block fabrications. The pre-assembling and individual match marking of each piece accounted for the excellent record established in the erection of the Pile. Other field fabrication work was performed in connection with the 105 and 205 Buildings; such as, the pouring and machining of special lead castings, field assembly of charging equipment, and the construction of precast concrete plugs and blocks.

A greater portion of the work in connection with Project 58 was of similar nature relying wholly upon field assembly of various items of construction such as the machining of carbon blocks.

(i) Additional Supervision

High caliber assistant craft and engineering supervision was brought in by the Company as back-up men. These men were assigned directly to the Process Areas. The redoubling of qualified key personnel effected a smooth-running organization and provided ample time for supervision to follow details closely that were normally left to be taken care of by themselves.

(j) Specification Changes

Dardalett bolts were substituted for rivets in the connecting of structural steel for Building 105 and 207. A saving of a week to ten days' time resulted in the erection of steel for the 105 Building, as well as enabled other crafts to work in portions of this building with reasonable safety. The time for the erection of steel for the 207 Building was cut in half.

(k) Expediting and Special Handling

Special field trips were made by the key personnel of the Wilmington Expediting and Control Department in the contacting of vendors regarding the delivery of critical material and equipment for Projects 9733 and 58. A close contact was maintained between these departments and respective departments set up in the Field whereby the Field was advised immediately of delays and the improvement of shipping dates for all critical orders. Special

transportation studies were made in order to coordinate the movement of material from suppliers to vendors and, in several cases, special tariffs were issued by the Interstate Commerce Commission for the direct movement by trucks of critical material and equipment during fabrication from sub-vendors to vendors and from the vendors to the plant site, regardless of the limited franchise held by the trucking company. Truck and express shipments were used entirely for orders requiring fast moves. The urgency of the job accounts for the fact that the number and weight of express shipments far exceed percentage used on other war contracts by the Company. Express air shipments were resorted to for light weight critical materials and equipment delaying the start-up of the Process Buildings.

B Personnel

1. General

Knoxville, Tennessee, is the center of over 160 manufacturing industries, including several large textile mills and railroad shops. Also located in the vicinity were three large manufacturers having war contracts other than those located on the Clinton Engineer Works Site; namely, the Aluminum Company of America located at Alcoa, Fulton Syphon Company and the Rohm & Haas Company, both of Knoxville. The Tennessee Valley Authority was also a major operator in this area.

The only other prime contractor working on the reservation prior to the time when du Pont became active was Stone and Webster Engineering Corporation, which had a large government War Construction Contract. During the construction period, the following companies became active prime contractors on the reservation: Ford, Bacon and Davis, Inc.; Tennessee Eastman Corporation; Carbide and Carbon Chemical Corporation; Kidmore, Cwings and Merrill; Roane-Anderson Company; William A. Pope Company; A. S. Schulman Electric Company; J. A. Jones Construction Company; Combustion Engineering Company; M. W. Kellogg Company; University of Chicago; and Kellex Corporation. These companies, as well as their numerous subcontractors, were all competing for personnel which the City of Knoxville and the surrounding communities found impossible to furnish, making it necessary to bring personnel in from outside the local area to man the project.

2. Employment

(a) Company Transfers

The Company transferred almost all of the key and specialized personnel employed on this project from other war projects under their jurisdiction in order to have a closely knit, smooth-running organization with a thorough working knowledge of the methods of operation and policies of the Company and because of the lack of local qualified persons not already engaged in essential work.

Transfer agreements provided for the reimbursement of the employee for certain costs and expenses incidental to his transfer to this project, which costs and expenses were charged to the performance of the contract with the United States Government covering the construction of Clinton Engineer Works.

Agreements included the reimbursement of the cost of transportation for the employee, and in some cases for his family and his household effects, including automobile, from his existing location to or near Knoxville, Tennessee, at the beginning of his employment there and return to the point of employment immediately prior to his assignment to War Construction. In some instances the employee was given a choice of the means of transportation,

either by rail, first class, or by automobile. In the latter case, the employee was reimbursed on a mileage basis at the rate of five cents a mile. Hotel, subsistence and other miscellaneous expenses enroute were allowed.

Living expenses were allowed for a stated period while the employee obtained a permanent place of residence at or near Knoxville, Tennessee. Similar expenses for obtaining a new place of residence at the end of his employment here were allowed in accordance with the War Construction Division "How" - Part 10, Item 102 - "Return Expenses Allowed." In a number of cases, the Field Project Manager approved the extension of the incoming allowance period because of the extreme shortage of suitable housing facilities.

The terms of transfer offered each employee were approved by the Field Project Manager and accepted by the transferee prior to his assignment to this project.

The key personnel from the Field Project Manager down through the Assistant Field Project Manager, Field Superintendent, Engineering Office Superintendent, Control Superintendent and Service Superintendent, with the exception of the Security Agent and the Safety and Fire Protection Supervisor, were all on the Wilmington Salary Roll. Certain other specialized personnel were also carried on the Wilmington Salary Roll.

Insofar as practical, the departments were manned with local help. The craft superintendent or department head prepared requisitions stating the number required and classification of the individual. The requisition was then approved by the superintendent having supervision over the respective craft or department and was further approved by the Assistant Field Project Manager, then submitted to the Personnel Supervisor for filling. If the requisition was for an individual with special talents that could not be obtained locally, the Personnel Supervisor contacted the Wilmington Office of the Company, sending them information as to the qualifications required for the job and requesting assistance in obtaining qualified personnel. The Wilmington Office of the Company would obtain from its personnel files a list of men having the required qualifications and would then contact the plant employing the individual regarding his availability for transfer to this project. If the files did not indicate that the Company had men with the specified qualifications, they circularized other projects asking for a list of men who might be capable of handling the job. Negotiations were then carried on for the transfer of the individual either through the Wilmington Office or directly between the Clinton Engineer Works and the project at which the man was employed.

The du Pont Company transferred thirty-five employees on the Wilmington Salary Roll to this project. One hundred and three other employees were also transferred to this project. The following tabulation gives the date the employee was transferred to and away from this project, name of project transferred from and to, and name and position held by the employee:

NAME	TITLE	DATE OF TRANSFER	TRANSFER FROM	TRANSFER TO OR TERMINATION	DATE OF TRANSFER
D. H. ABBOTT	DIVISION ENGINEER	5-8-43	ALABAMA ORD. WKS.	H. E. W.	12-25-43
W. F. ALMON	ASS'T 105 AREA ASS'T SUPT.	5-5-43	ALABAMA ORD. WKS.	H. E. W.	10-20-43
P. W. BAIRD	CLERICAL SUPERVISOR	1-25-43	GOPHER ORD. WKS.		
D. R. BARNHILL	ASS'T CRAFT SUPT. TRANS.	5-6-43	OKLAHOMA ORD. WKS.	H. E. W.	12-6-43
G. D. BARR	INVESTIGATION SUPERVISOR	2-20-43	OKLAHOMA ORD. WKS.	H. E. W.	2-15-44
W. A. BARR	ASS'T 105 RECORDS ENGINEER	7-19-43	LOUISVILLE NEOPRENE	WILMINGTON, DEL.	10-23-43
A. W. BARTONS	ASS'T KICKS NAT'L ENGINEER	6-7-43	MARSHALL PLANT		
W. H. BASSETT	ENGINEER	1-25-43	GOPHER ORD. WKS.	H. E. W.	3-17-44
P. A. BAYNE	ASS'T MGT. & STORES SUP'V.	8-1-43	LEOMINISTER CONST.		
H. E. BEDELL	ASS'T 105 RECORDS ENGINEER	5-13-43	ALABAMA ORD. WKS.	T. M. I. ROLL	10-24-43
A. BERKEMIER	ASS'T SERVICE SUPERINTENDENT	7-6-43	MARSHALL PLANT	GRABELLI, N. J.	3-11-44
S. D. BLAKLEY	ENGINEER	2-14-43	WILMINGTON, DEL.		
R. O. BOGGS	INSPECTOR	5-10-43	OKLAHOMA ORD. WKS.	TERMINATED	12-22-43
L. J. BOYETT	ASS'T ELCT. CRAFT SUPT.	5-7-43	ALABAMA ORD. WKS.	H. E. W.	12-25-43
D. G. BRADY	OUTSIDE LABOR RECRUITER	7-8-43	NIAGARA FALLS PLANT	TERMINATED	11-9-43
DR. H. C. BROWN	PHYSICIAN	8-8-43	NIAGARA FALLS PLANT	BELLS WORKS	11-19-43
T. M. BROWN	MNT. CRAFT SHIFT SUPERINTENDENT	5-6-43	GOPHER ORD. WKS.	H. E. W.	1-5-44
N. B. BROWNING	ASS'T PRIORITIES & CMP ENGR.	7-8-43	MORGANTOWN ORD. WKS.	MORGANTOWN ORD. WKS.	2-12-44
A. J. BRUCKERT	FIELD SUPERINTENDENT	1-26-43	KINGS MILL ORD. WKS.	H. E. W.	4-14-43
J. F. BUMPUS	105 AREA ASST. SUPT.	4-3-43	MORGANTOWN ORD. WKS.	H. E. W.	10-27-43
T. J. BURN	RECEIVING	2-15-43	WILMINGTON, DEL.	TERMINATED	7-31-43
R. CALDWELL	RIGGER CRAFT SUPT.	2-8-43	OKLAHOMA ORD. WKS.	H. E. W.	11-20-43
W. E. CHAPUT	105 AREA ASST. MNT. SUPT.	6-5-43	GOPHER ORD. WKS.	H. E. W.	10-20-43
R. H. COFFEY	GEN. BLDG. CRAFT SHIFT SUPT.	5-7-43	GOPHER ORD. WKS.	H. E. W.	12-25-43
J. E. COLGIN	REINF. STEEL CRAFT SUPT.	2-7-43	GOPHER ORD. WKS.	H. E. W.	10-2-43
G. S. COLLIER	ASS'T. FIELD PROJECT MANAGER	1-22-43	GOPHER ORD. WKS.	WILMINGTON, DEL.	1-6-44
E. J. CONROY	ASS'T EXPEDITING ENGINEER	3-20-43	CHICKASAW ORD. WKS.	WILMINGTON, DEL.	10-30-43
W. F. COOK	CARPENTER CRAFT SUPT.	2-8-43	KANKAKEE ORD. WKS.		
A. P. CRENS	NAT'L CONTROL, PRIORITIES & CMP ENGINEER	2-23-43	OKLAHOMA ORD. WKS.		
D. CROWDER	PAYROLL	1-25-43	WABASH RIVER ORD. WKS.	TERMINATED	9-13-43
F. P. DRANE	ASS'T PLAN. & SCHED. ENGR.	4-2-43	INDIANA ORD. WKS.	TERMINATED	1-31-44
E. DE BURN	ENGINEER	3-21-43	LONGSHORN ORD. WKS.	WILMINGTON, DEL.	12-12-43
J. P. DEVINE	OUTSIDE LABOR RECRUITER	5-27-43	GOPHER ORD. WKS.	TERMINATED	11-8-43
R. C. DORNY	ELEC. CRAFT SHIFT SUPT.	8-22-43	LOUISVILLE NEOPRENE	TERMINATED	1-8-44
A. J. DORNICK	INSPECTOR, SENIOR - TESTING	8-22-43	ALABAMA ORD. WKS.	H. E. W.	12-4-43
C. L. DORSY	GEN. BUILDING CRAFT SUPT.	1-25-43	CHICKASAW ORD. WKS.	GRABELLI, N. J.	3-15-44

H. P. DOUGLAS	SIGN-UP	1-25-43	OKLAHOMA ORD. WKS.	H. E. W.	10-30-43
F. I. DURHAM	SENIOR CLERK	9-8-43	ALABAMA ORD. WKS.	SPRUANCE PLANT	3-29-44
J. E. KARLEY	DIVISION ENGINEER	3-31-43	ALABAMA ORD. WKS.	H. E. W.	1-1-44
J. H. EDGELL	ENGINEER	7-12-43	WILMINGTON, DEL.		
C. S. KILFR	BUYER	5-24-43	NIAGARA FALLS PLANT	MORGANTOWN ORD. WKS.	2-26-44
R. W. ERICKSON	ASS'T CONCRETE CRAFT SUPT.	5-5-43	ALABAMA ORD. WKS.	H. E. W.	11-13-43
W. J. PEYDER	ASS'T PLAN. & SCHED. ENGR.	6-30-43	GOPHER ORD. WKS.	TERMINATED	4-1-44
J. K. FINE	TIMBERING SUPERVISOR	1-25-43	WARASH RIVER ORD. WKS.	GRASSELLI, W. J.	3-11-44
J. W. FITZPATRICK	PERSONNEL SUPERVISOR	1-23-43	OKLAHOMA ORD. WKS.	WILMINGTON, DEL.	1-1-44
S. E. FOGG	ENGINEER	1-30-43	OKLAHOMA ORD. WKS.	GRASSELLI, W. J.	3-15-44
J. H. FRANKFORT	ENGINEER	5-28-43	OKLAHOMA ORD. WKS.	H. E. W.	11-20-43
P. FREDERICKS	PATROL SUPERVISOR	1-29-43	MARSHALL PLANT	T. H. I. ROLL	10-18-43
M. J. FURNER	CLERK	6-21-43	MARSHALL PLANT		
H. L. GALLIGAN	PIPE CRAFT SUPERINTENDENT	2-9-43	GOPHER ORD. WKS.	GRASSELLI, W. J.	3-26-43
S. L. GAIN	RIGGER FOREMAN	5-13-43	CHICKASAW ORD. WKS.	TERMINATED	3-11-44
R. T. GARDNER	DIVISION ENGINEER	1-25-43	OKLAHOMA ORD. WKS.	H. E. W.	12-5-43
E. E. GARWER	ASS'T CRAFT SUPT.	9-6-43	HANFORD ENGR. WKS.	H. E. W.	1-8-44
R. L. GILLESPIE	TAKE-OFF ENGINEER	8-28-43	MARSHALL PLANT	WILMINGTON, DEL.	12-5-43
C. A. GOODWIN	ASS'T LABOR CRAFT SUPT.	7-29-43	GOPHER ORD. WKS.	H. E. W.	11-13-43
J. F. GREENE	SAFETY ENGINEER	7-26-43	BATON ROUGE CONST.		
H. C. GUY	JUNIOR CLERK	9-8-43	ALABAMA ORD. WKS.	TERMINATED	10-1-43
P. G. HANLIN	INSPECTOR WELDING	8-23-43	ALABAMA ORD. WKS.	H. E. W.	12-4-43
C. W. HASTY	LOS AREA GEN. SUPT.	4-26-43	MORGANTOWN ORD. WKS.	H. E. W.	1-14-44
E. D. HELMUTOLLER	ELECTRICAL CRAFT SUPT.	2-2-43	WILMINGTON, DEL.	GRASSELLI, W. J.	3-24-44
T. C. HILL	FIELD SUPERINTENDENT	3-27-43	GOPHER ORD. WKS.		
G. W. HINDS	INT. VIEWER	2-15-43	INDIANA ORD. WKS.	H. E. W.	1-22-44
K. J. HOLLOWELL	P. & S. & EXCESS MAT'L ENGR.	1-28-43	WILMINGTON, DEL.		
G. D. HOY	LOS AREA ASST. MGT. SUPT.	5-31-43	WARASH RIVER ORD. WKS.	H. E. W.	10-20-43
H. M. HULS	ASS'T PERSONNEL SUPERVISOR	8-22-43	BUFFALO CONST.	H. E. W.	1-19-44
H. E. JACOBS	ENGINEER	2-9-43	KANKAKEE ORD. WKS.	H. E. W.	11-16-43
G. KARLSTERN	EMPLOYMENT SUPERVISOR	2-7-43	OKLAHOMA ORD. WKS.	H. E. W.	3-20-43
A. R. KIBLER	PURCHASING AGENT	1-25-43	MARSHALL PLANT	GRASSELLI, W. J.	3-11-44
R. M. KEMADY	LOS RECORDS ENGINEER	5-16-43	WILMINGTON, DEL.	H. E. W.	10-20-43
S. KIDD	EXPEDITING ENGINEER	1-29-43	MARSHALL PLANT	WILMINGTON, DEL.	3-22-44
B. L. KISSEL	RECEIVING AND STORES SUP' V.	1-25-43	CHICKASAW ORD. WKS.	EAST CHICAGO	2-19-44
F. B. KHAMER	CHIEF INSPECTOR	7-15-43	LOUISVILLE NEOPRENE	H. E. W.	3-18-44
F. J. KRAZEL	ENGINEER	6-10-43	OKLAHOMA ORD. WKS.	TERMINATED	8-22-43
J. C. LEHMAN	INSTRUMENT MAN	5-27-43	MARSHALL PLANT		

B. W. L'WALLIN	SUBCONTRACTOR ACCOUNTANT	7-19-43	ALABAMA ORD. WKS.		
W. L. LEWIN	SHIFT SUPERINTENDENT	6-2-43	CHICKASAW ORD. WKS.	H. E. W.	1-15-44
J. E. LINDEMAN	ASS'T SAFETY AND P. P. SUP'V.	5-17-43	CHICKASAW ORD. WKS.	H. E. W.	12-25-43
C. H. LITTLE	ENGINEER	9-20-43	WABASH RIVER ORD. WKS.	TERMINATED	11-18-43
A. B. LUNDBERG	MATERIAL SUPERVISOR	2-21-43	MORGANTOWN ORD. WKS.	H. E. W.	12-3-43
G. H. LUTZEMBERGER	105 AREA ASST. MNT. SUPT	7-25-43	GOPHER ORD. WKS.	H. E. W.	10-20-43
M. A. LYONS	COST & CONTRACT ENGINEER	1-25-43	MARSHALL PLANT	GRASSELLI, M. J.	3-18-44
A. C. MACEL	STENOGRAPHER	2-5-43	WABASH ORD. WKS.	GRASSELLI, M. J.	
J. E. MATTINGLY	ASS'T CLERICAL SUPERVISOR	6-23-43	NIAGARA FALLS PLANT	H. E. W.	12-26-43
W. H. MATTINGLY	ASS'T COST & CONTRACT ENGR.	4-12-43	INDIANA ORD. WKS.	H. E. W.	2-29-44
T. P. MC CAFFERTY	LEADWORKER SUPERINTENDENT	5-31-43	GOPHER ORD. WKS.	G. O. W.	6-15-43
C. D. MC CULLON	MATERIAL SUPERVISOR	1-24-43	OKLAHOMA ORD. WKS.	H. E. W.	2-28-43
L. H. MC DONALD	PAYMASTER	1-23-43	GOPHER ORD. WKS.	TERMINATED	6-3-43
S. MC FARLAND	MILLRIGHT CRAFT SUPT.	1-28-43	GOPHER ORD. WKS.		
E. C. MC NEELY	SENIOR CLERK	9-28-43	BELLE FONKS	TERMINATED	12-18-43
				(REINSTATED AT H. E. W.)	
R. W. MERCIER	ASS'T OFFICE ENGINEER	7-26-43	NIAGARA FALLS PLANT		
E. N. MILLER	105 AREA ASST. MNT. SUPT.	6-12-43	MORGANTOWN ORD. WKS.	H. E. W.	11-2-43
H. M. MILLER	SERVICE SUPERINTENDENT	1-23-43	WABASH RIVER ORD. WKS.	H. E. W.	3-3-43
H. W. MILLER	DIVISION ENGINEER	2-12-43	OKLAHOMA ORD. WKS.	H. E. W.	12-26-43
J. R. MOSS	ASS'T MILLRIGHT CRAFT SUPT.	5-10-43	OKLAHOMA ORD. WKS.	H. E. W.	1-13-44
J. N. MUMFORD	ASS'T CONTROL SUPT.	8-1-43	BELLE WORKS	GRASSELLI, M. J.	11-17-43
E. A. MURPHREE	SECURITY AGENT	2-1-43	OKLAHOMA ORD. WKS.		
W. B. MURRELLEY	CONTROL SUPERINTENDENT	1-24-43	KANKAKEE ORD. WKS.		
H. E. MURLEY	ASS'T LABOR CRAFT SUPT.	5-6-43	ALABAMA ORD. WKS.	TERMINATED	2-16-44
J. K. MYRDIN	ENGINEER	6-19-43	GOPHER ORD. WKS.		
R. J. OSBURN	TRANSPORTATION CRAFT SUPT.	2-6-43	OKLAHOMA ORD. WKS.	H. E. W.	3-11-44
W. P. PARIS	ENGINEER	8-22-43	LOUISVILLE NEOPRENE	H. E. W.	1-10-44
J. M. PETERS	CLERICAL SUP'V. PURCHASING	1-25-43	GOPHER ORD. WORKS	T. N. X. RO..	10-21-43
W. B. RANDOLPH	ENGINEER	2-8-43	GOPHER ORD. WORKS	H. E. W.	12-28-43
W. S. RASMUSSEN	SAFETY AND FIRE PROT. SUP'V.	1-25-43	GOPHER ORD. WORKS	TERMINATED	2-25-44
H. D. REESE	SERVICE SUPERINTENDENT	2-22-43	MORGANTOWN ORD. WKS.	H. E. W.	11-18-43
F. C. ROSS	TRAFFIC SUPERVISOR	2-1-43	WILMINGTON, DEL.	T. N. I. ROLI	12-1-43
G. L. ROSS	ASS'T. MAT'L CONTROL ENGR.	4-5-43	INDIANA ORD. WKS.		
P. W. RUEFF	PAYROLL SUPERVISOR	6-13-43	OKLAHOMA ORD. WKS.	TERMINATED	12-31-43
H. M. RUPERT	ENGINEER	9-13-43	MORGANTOWN ORD. WKS.	MORGANTOWN ORD. WKS.	11-30-43
J. P. SANTOWSKI	PIPE CRAFT SHIFT SUPT.	8-25-43	LOUISVILLE NEOPRENE	TERMINATED	1-17-44

J. C. SAULS	ELECTRICAL ENGINEER	4-26-63	OKLAHOMA ORD. WKS.	WILMINGTON, DEL.	3-16-66
R. F. SCHLUMZ	DRAFTSMAN	5-3-63	GOPHER ORD. WKS.	DYE WKS.	12-6-63
C. S. SEKTON	MATERIAL CONTROL ENGR.	3-1-63	INDIANA ORD. WKS.	TERMINATED	3-27-63
G. T. SIZER	ASS' T 105 AREA ASST. SUPT.	5-7-63	NIAGARA FALLS PLANT	H. E. W.	10-1-63
M. A. SPEAR	LABOR CRAFT SUPERINTENDENT	2-6-63	GOPHER ORD. WKS.	H. E. W.	3-18-66
R. C. STANTON	DIVISION ENGINEER	5-2-63	WILMINGTON, DEL.	H. E. W.	10-6-63
B. J. STONE	105 AREA ASST. MNT. SUPT.	6-21-63	ALABAMA ORD. WKS.	H. E. W.	10-20-63
A. C. STRICKLAND	ENGINEERING OFFICE SUPERINTENDENT	1-26-63	INDIANA ORD. WKS.		
M. SWEDBERG	TAKE-OFF ENGINEER	7-12-63	GOPHER ORD. WKS.	WILMINGTON, DEL.	11-21-63
G. Y. SWICKARD	MEDICAL SUPERVISOR	1-25-63	GOPHER ORD. WKS.	WILMINGTON, DEL.	2-29-66
G. H. TAYLOR	ASS' T PIPE CRAFT SUPT.	5-6-63	GOPHER ORD. WKS.	H. E. W.	12-25-63
J. A. THOMPSON	ASS' T CRAFT SUPT.	6-19-63	WILMINGTON SHOPS	WILMINGTON, DEL.	7-23-63
E. H. TRAVENNER	ASS' T CAMP. CRAFT SUPT.	5-10-63	GOPHER ORD. WKS.	DYE WKS.	
				(DEEP WATER, N. J.)	7-11-63
E. H. VASS	ASS' T SHIFT ENGINEER	7-19-63	GOPHER ORD. WKS.	H. E. W.	12-11-63
G. P. WALTHER	ASS' T INSTRUMENT ENGR.	10-12-63	LOUISVILLE NEOPRENE	H. E. W.	3-11-66
H. E. WALTON	TIMEKEEPING CLERK	6-21-63	OKLAHOMA ORD. WKS.	H. E. W.	12-6-63
E. C. WEBER	CHIEF ACCOUNTANT	1-27-63	MARSHALL PLANT	T. N. I. ROLL	11-1-63
J. D. WILSON	FIELD PROJECT MANAGER	1-18-63	MARSHALL PLANT	GRASSELLI, N. J.	3-11-66
J. B. YELTON	CONCRETE CRAFT SUPT.	2-11-63	GOPHER ORD. WKS.	H. E. W.	10-6-63
C. L. ZAKAIB	ASS' T CRAFT SUPT.	9-13-63	MORGANTOWN ORD. WKS.	H. E. W.	1-8-66

[REDACTED]

(b) Local Employment

On Monday, February 1, 1945, a local employment office was opened at 422 West Cumberland Avenue by the E. I. du Pont de Nemours & Company (Inc.), for the employment of personnel referred to the Company by the United States Employment Service. All requisitions for manual and non-manual workers were placed by the du Pont Personnel Supervisor with the local United States Employment Service for filling. At no time did the du Pont Company advertise locally for help but complied with the rules and regulations established by the War Manpower Commission in the employment of personnel.

None of the manual employees of this job were transferred with expenses paid from other du Pont construction projects, but were all employed through the aid of the local branch of the United States Employment Service.

Most of the clerical help on this project was also obtained through the local United States Employment Service although, due to the shortage of clerical workers in this area which had been previously drained by other contractors, it became necessary to import clerical help from outside and from other du Pont Construction Projects. The employment of such personnel was usually on a basis of termination and reinstatement, conditions of which were that the expenses of relocation of the individual were not reimbursable by the Company; however, the individual would maintain continuity of service with the Company.

Sufficient personnel was obtained through the local United States Employment Service for all of the crafts and they were able to provide a balanced construction crew, with the exception of labor. As of November 15, 1945, a total of 4095 employees, which was approximately 66% of the total employment, were hired through the Knoxville Branch of the United States Employment Service. Of this total, approximately 36.2% of the men were local residents and came from within a fifty-mile radius of the project. The balance had to be obtained from outside the local area. In the case of common labor, because of the acute shortage of available labor, it was necessary to supplement the help given by the local United States Employment Service with an active recruitment program carried on by this Company under procedures established by the War Manpower Commission of the United States Employment Service. The recruitment program for common labor will be discussed in detail because of its relative importance toward the speed of construction for these projects.

Listed below, by crafts, are the total number of employees hired up to November 15, 1945, as well as the percentages of residents and non-residents employed:

<u>Craft</u>		<u>Total Employed</u>	<u>% Resident</u>	<u>% Non- Resident</u>
1. Labor		3222		
	(a) Laborers	3209	49	60
	(b) Janitors	13	100	0
2. Carpenters		903	16	84
3. Millwrights		340		
	(a) Millwrights	278	8	95
	(b) Machinists	23	39	70
	(c) Welders	13	71	29
	(d) Blacksmiths	3	100	0
	(e) Sheet Metal Workers	76	7	93
4. Structural Iron Workers		144	12	88
5. Reinforcing Iron Workers		39	5	95
6. Cement Finishers		30	14	86
7. Painters		66	25	75
8. Bricklayers		4	33	67
9. Transportation		357		
	(a) Truck Drivers	190	65	35
	(b) Fireman Stationary	3	25	67
	(c) Power Equip. Operators	70	38	62
	(d) Gas & Diesel Mechanics	22	55	45
	(e) Oilers	25	19	81
	(f) Chauffeurs	17	65	35
10. Non-Manual		756		
	(a) Rodman	29	45	55
	(b) Clerical Engineers Supervision	575	56	44
	(c) Patrolmen	152	98	2
	Grand Total	5075		

(c) Recruitment of Common Labor

Du Pont was especially concerned with the shortage of available common labor in the vicinity. The existence of this shortage was apparent at the start of construction and the Company took steps to alleviate this condition. Contact was established with Mr. E. B. Rhogness, Manager of the local United States Employment Service located in Knoxville, Tennessee, who, realizing that the situation was critical, assured the Company of the cooperation of the Service.

An advertisement appeared under the name of the United States Employment Service for a period of five days in both of the local newspapers of Knoxville in an endeavor to recruit whatever available labor remained in the vicinity.

It was found that approximately 26% of the laborers who were signed up for employment did not report for work. An investigation was made and it was found that this condition existed because most of those employed did not have sufficient funds to pay for their transportation to the project. The findings were reported to the Area Engineer who approved the furnishing of transportation tickets to those newly employed, the cost of which was deducted from their weekly pay check. This plan became effective April 16, 1943.

H. D. Reese, Jr., Service Superintendent, made a personal investigation of the possibility of obtaining labor from nearby communities located west of the project and found that those employed by Du Pont would have to travel an additional eleven miles than if they worked for Stone and Webster Engineering Corporation. Because of this difference in travel distance, the Company was unable to obtain its share of labor from that district. In spite of this handicap, the Company made arrangements to attempt to obtain men from this area but the effort resulted in a failure to sign up any laborers.

On May 8, 1943, the Company advised the United States Employment Service that it required 275 additional laborers during the remainder of the month and at that time were informed that Stone and Webster Engineering Corporation was planning to provide quarters for 200 laborers on their project site. Further complications of the labor employment picture was the policy adopted by some of the contractors of placing requisitions for rated labor which made it more difficult to obtain common labor as the men preferred to take employment at the higher rate paid to rated labor. The other contractors were also employing seventeen-year-old men. Stone and Webster Engineering Corporation was also requisitioning negro women for labor work. The other companies also began subsidizing the bus service; the bus rate to the Du Pont Project was \$2.50 per week and to the other contractors' projects was only \$1.50 per week.

S. B. Colgate, Service Supervisor of the Construction Division, Wilmington Office, was in Knoxville during the period May 10 to May 15, 1943, inclusive, and assisted in the establishment of a program for the recruitment of common labor.

Reese and Colgate met with E. B. Rhegness, local manager of the United States Employment Service, and discussed the common labor question. Mr. Rhegness admitted that the Knoxville Area was unable to supply the critical needs of all the contractors of the Clinton Engineer Works. At the same time, du Pont was refused the necessary clearance to recruit labor outside of the local Knoxville Area until the Company could satisfy the Employment Service that living quarters were available for labor so recruited. Rhegness advised that the Stone and Webster Engineering Corporation had been granted clearance to recruit in areas outside the local Knoxville Area on the basis that they were providing housing and complete living facilities for approximately five hundred laborers on the project and that they had knowledge of housing facilities for approximately one hundred men in the City of Knoxville. He also advised that labor recruited from another area had to be guaranteed paid transportation to the project and that this transportation had to be an outright grant, not an advance and capable of being recaptured through payroll deductions. It thus was made apparent that a successful recruitment program for common labor depended on the housing facilities available which added another problem for Management to overcome.

The Wilmington Office was advised of the results of the meetings and they instructed J. D. Wilson, Field Project Manager, to contact Colonel Warren George, Area Engineer, and request permission to retain the services of a realtor to locate suitable living quarters for recruited labor. He was further advised to present the problem of the use of semi-skilled labor, employed on the Clinton Engineer Works, on work that it was felt the classification of common labor covered.

Wilson, Reese and Colgate met with Lt. Colonel Warren George on the afternoon of May 10, 1943, and obtained his approval to subsidize the cost of bus transportation to the extent of 50% for the employees of du Pont and Cost-Plus-A-Fixed-Fee Subcontractors working on the project, and also obtained his approval as to the employment of a competent realtor to conduct a housing survey. He suggested that the gearbox school be remodeled as a dormitory for both white and colored laborers. The Colonel's attention was directed to the practice of certain contractors employing workers at semi-skilled rates on the project and the problem such a practice would create, and he indicated that he favored the employment of all labor at the common-labor rate and then upgrading them, using the higher semi-skilled classifications as an incentive to better performance and as a reward for past performance.

On May 14, 1943, T. L. Pierce and S. B. Colgate participated in a discussion of the labor problem at the office of the Project Manager. General L. E. Grove was fully informed of the Company's

attempts at recruitment, and it was his opinion that immediate clearance to recruit labor over the entire Region Seven or elsewhere must be granted if the work on this project was not to be delayed and also that an increase in the basic rate for common labor was necessary. The General instructed Lt. Colonel Robert C. Blair to call Mrs. O'Leary in Washington, D. C., and to inform her of the labor problem at Clinton Engineer Works and to instruct her to contact a Colonel Barker and a Colonel Farrell, requesting that they approach the proper authorities in the War Manpower Commission to secure clearance for the Company wherever needed. Colgate was also requested to telephonically contact Mrs. O'Leary and inform her of du Pont's program of recruitment, which was done.

On May 17, 1943, the Company obtained clearance from the Atlanta Office of the United States Employment Service for an itinerary into seven points in the State of Mississippi. A recruiting staff was organized and was advised:

1. Of the itinerary for the recruitment trip into Mississippi.
2. That the railroad fare of the recruited men was tax exempt.
3. That the United States Employment Service Office to be visited the following day was to be so advised, by telegram, one day prior to the date of arrival and requested to provide working quarters for an interviewer and a physician. If such quarters were not obtainable upon arrival, a hotel room was to be engaged for that purpose.
4. That the United States Employment Service Interviewer was to see the applicant first and explain the conditions of employment.
5. That the United States Employment Service Interviewer was then to clear the applicant to the Company's interviewer, which signified that from the War Manpower Commission's standpoint the applicant was satisfactory for employment.
6. That the Company's interviewer was to determine the referral's suitability for the job, considering background and checking previous Company employment, if possible. If the applicant was acceptable to the interviewer, the referral was to be sent to the physician. If the applicant was rejected by either the doctor or the interviewer, the local manager of the United States Employment Service was to be given the rejector's name at the end of the day.
7. That referrals who passed medical were to be advised in writing of the time and place to report in order to get transportation to Knoxville from the point of recruitment.

- [REDACTED]**
8. That the following general information was to be given to all applicants:
- (a) The present work week was fifty-eight hours with time and one-half paid for all work in excess of forty hours.
 - (b) The rate for common labor was fifty cents an hour.
 - (c) That there was opportunity for promotion to semi-skilled labor jobs but that absolutely no guarantee of promotion was given.
 - (d) That, effective May 24, 1943, bus transportation from Knoxville to the project was \$1.50 per week.
 - (e) That the rate of available rooming facilities started at \$2.10 per week and meals at approximately \$3.40 per week.
 - (f) That white applicants were to be informed that if they wanted to come to Knoxville, the Company would be willing to send them but could not guarantee living quarters.

A Company physician accompanied the recruiting crews at the beginning of the recruitment program. As the program advanced, it was found that local doctors could be used satisfactorily for the purpose of giving applicants a physical examination for culling out laborers physically unfit for work, prior to transporting them to Knoxville, Tennessee, for sign-up.

On June 1, 1943, the Wilmington Office approved the employment of laborers over sixteen years of age and, in connection with the employment of these minors, the Company obtained permission to issue certain required documents. Du Pont was advised by F. C. Mathis, the local representative of the Department of Labor, that there were no restrictions as to the number of hours or shifts that youths over sixteen years of age could work but that they could not be permitted to drive trucks or to work around dangerous machinery. It was necessary that a working permit be issued by the School Board. S. E. Bryant, State Labor Commissioner, approved the issuance of the work permit by the Company, instead of the School Board, at the time of the employment interview. Before such a permit could be issued, a medical statement was required of the minor applicant. Dr. Ennis, City Health Officer, deputized one of the du Pont physicians to give the examination as he did not have adequate personnel to give many such examinations. Although arrangements were made for the employment of minors over sixteen years, none were employed under seventeen years of age and those seventeen years old from out of the state were required to obtain approval from the proper authorities before being employed.

[REDACTED]

On June 3, 1943, the United States Employment Service informed the du Pont Company that they had received word from authorities in Washington that this project was very essential and that every prospect for employment was to be directed to the contractor recruiting for the project. In the larger cities, it was found that although our recruiting crew brought in many men to the United States Employment Service for clearance, few would be referred to the Company for interviewing. In some of these cases the individuals did not have the proper release, although it was found in many cases that the United States Employment Service gave preference to local work and it was apparent that they did not desire the men to leave the immediate vicinity. In some cases, the local business houses objected and brought sufficient pressure to bear upon the United States Employment Service so that the men were not referred to the Company for interview. Du Pont was denied clearance for recruiting in some areas that were declared critical by the Employment Service.

On June 4, 1943, John Flaherty of General Grove's staff; Major Welch, Labor Relations Officer, Clinton Engineer Works; E. B. Rhegness, Manager of the United States Employment Service; Oscar Tate, a special representative out of the Atlanta Office of the War Manpower Commission; W. J. Hatfield of the Staff of the Area Engineers Labor Relations Office; H. D. Reese, Jr., D. B. Purcell, and E. B. Colgate of the du Pont Company, met and discussed the recruitment program of the du Pont Company. Tate informed the Company that he had been authorized by executive order from Washington to give the Company clearance into any town in Region Seven and also to direct that in those towns the Company be given preference over all others in the procurement of labor for the Clinton Engineer Works. He also stated that he would assist the Company in securing clearance outside of Region Seven, wherever it deemed advisable to recruit.

The priority given this project on common labor only was that all laborers applying for work at any United States Employment Service Office where a contractor of this project was recruiting must be referred to the contractor before local employment could be given.

A clear release was not necessary even if the individual worked in an essential industry except in case the individual quit another 100% government-supervised project.

Du Pont was granted clearance into Memphis, Tennessee, for a two-day recruitment period, June 7 and June 8, 1943, with the understanding that if, in the Company's opinion, the flow of applicants justified further recruitment there, the Company would be permitted to remain actively recruiting as long as was desirable.

An investigation was made by the Company of a complaint that, in the upgrading of laborers from common to semi-skilled classifications, the Company was showing partiality to white employees and, because of this, the colored laborers felt that they were not being offered opportunity for advancement on this project. An investigation was also made of a complaint that the employees were being forced to stand on the busses when in transit from Knoxville to the plant site.

These complaints were found to be completely without justification. It was determined that 24.8% of the colored laborers employed were promoted while only 19.9% of the white laborers were so increased.

The 50 cent hour pay rate for common laborers was discussed with J. Flaherty who, when informed that as of January 1, 1941, the Tennessee Valley Authority and the construction forces of the Alcoa Plant were paid at the rate of 49 cents and 50 cents per hour for common labor respectively, stated that he could guarantee a 57½ cent rate under the "Little Steel Formula".

A meeting was held on June 17, 1943, at which were present Lt. Colonel Blair, Lt. Colonel George, Major Welch, Capt. Retenbach, W. J. Hatfield, E. B. Tucker, and J. T. Catron of the War Department; G. Tate and J. H. White of the War Manpower Commission; W. F. Marus of J. A. Jones Construction Company; J. F. Havermeyer, Jr., of O'Driscoll and Grove, Inc.; T. C. Williams and T. W. Piper of Stone & Webster Engineering Corporation; and H. D. Reese, Jr., of du Pont Company. The purpose of the meeting was to establish a mutual understanding and to review the War Manpower Commission's charges against certain Clinton Engineer Works employers for conducting illegal recruiting. Charges were made against several of the contractors. No complaint was made relative to the recruiting carried on by du Pont Company. The results of this meeting were that the Clinton Engineer Works contractors agreed to follow fixed recruitment itineraries which were cleared by the War Manpower Commission and that more than one contractor could be cleared for recruiting at the same time into Memphis, Tennessee, and Birmingham, Alabama. In all other towns in Region Seven only one contractor was to be allowed to be scheduled at one time.

The contractors and Corps of Engineers representatives pointed out that the "red tape" involved in obtaining clearance through the United States Employment Service hindered recruitment and, in many instances, caused a loss of potential labor supplies. Piper of Stone and Webster Engineering Corporation specifically stated that the United States Employment Service had been of no help in recruitment to his company and charged that local United States Employment Service officials encouraged men in their district to stay home.

Tate of the War Manpower Commission complimented the du Pont Company for its cooperation in conducting an orderly recruitment program.

On July 5, 1943, when recruiting in Atlanta, Georgia, and Memphis, Tennessee, it was discovered that the high priority given this project on labor had been suddenly cancelled. Men brought into the United States Employment Service Office by the Company or who came in on their own accord were not given clear releases and referred to the du Pont interviewer.

On July 12, 1943, the new common labor rate of 57½ cents per hour was placed in effect and the recruiting crews in the field were advised immediately of the new rate.

The recruiting party at Birmingham, Alabama notified the

Company that A. N. Parsons, local United States Employment Service Manager, had been instructed by J. J. Downing, Birmingham War Manpower Commission Director:

1. To immediately order the du Pont foremen off the streets and not allow the further practicing of "bush beating".
2. That all men are to be screened and offered local jobs first if they are interested.
3. That no men are to be referred to the Company unless they have absolutely clear releases.

On July 13, 1943, the United States Employment Service Manager received instructions from the Birmingham War Manpower Commission Director to cancel immediately all pooled interviewers as Birmingham had been declared a Critical Labor Shortage Area. The flow of referrals stopped at noon and A. N. Parsons agreed that the Company could take the ten men recruited during the morning.

Lt. Col. George informed J. D. Wilson that the priority held by Clinton Engineer Works on labor had not been restored as it was the opinion of the War Manpower Commission that the Clinton Engineer Works had had sufficient time to recruit laborers needed under the priority set-up.

On July 14, 1943, H. D. Reese, Jr., and A. Berkemeier met with Oscar Tate to discuss recruitment and the Company was advised by Tate:

1. To officially inform the local United States Employment Service office of the new rate established for common labor on the project.
2. That Dr. H. F. Ashe, Regional Director of War Manpower Commission, a representative of the Corps of Engineers, and a Washington representative of the War Manpower Commission met in Washington, D. C., on July 12, 1943, and decided that the War Manpower Commission would continue to withhold the use of the priority previously given this project and that the recruiting parties would not be permitted under any conditions or in any form to continue the practice of "bush beating".

The elimination of "bush beating" required the Company to rely solely on advertising and waiting in the United States Employment Service Office for laborers to be referred to the Company as they came into the office. Handbills were used and distributed by the employees of the United States Employment Service Office and were used to back up the newspaper advertising. Radio was also used to a very limited extent.

This placed recruitment back on the same status as existed during the early phases of construction. Tate advised that he would submit a proposal to Mr. Constance, Assistant Regional

Director, Region 7, War Manpower Commission, "that in Region 7, the Clinton Engineer Works is to have a priority in the United States Employment Service Offices during the days a Clinton Engineer Works employer is scheduled to recruit in these offices". This proposed priority was to operate as follows: That on scheduled recruiting in a particular office, all men coming into the office were to be referred to the Company for jobs instead of local jobs, provided that the men had clear releases.

Tate obtained approval of the proposed priority for use in Tennessee only, which limited the most effective type of recruitment to the State of Tennessee. The limited priority did not provide for the release of essential workers to the Clinton Engineer Works contractors but it did provide that every laborer who came into the United States Employment Service Office when one of the Clinton Engineer Works contractors is recruiting in that particular office, would be referred to the contractor for interview and would not be offered local employment until the recruiting contractor has had an opportunity to interest the applicant in a job at Clinton Engineer Works.

Full benefit was not obtained in the operation of this plan due to the lack of cooperation of some of the United States Employment Service offices and of the County Farm Agents and because of other contractors and subcontractors on this project did not abide by the regulations governing recruitment as set up by the War Manpower Commission and the United States Employment Service.

Warren George, Lt. Col., Corps of Engineers, by letter dated July 22, 1943, directed that all labor recruitment for this project be done by the United States Employment Service through their regular channels and advised that the priorities previously held by the contractors on the Clinton Engineer Works were cancelled. Contractors recruiting employees were instructed to establish itineraries with the Knoxville Office of the United States Employment Service and were required to fill all itineraries scheduled. He advised that the War Manpower Commission agreed to furnish the necessary workers to man the project if the following conditions existed:

1. Contractors must be utilizing their present labor force.
2. Requests from the contractors must represent the minimum needs.
3. Transportation from the point of recruitment to the job must be provided and, in cases where the employee is not acceptable to the contractor, transportation back to the point of recruitment will likewise be provided.
4. The contractor was to follow a scheduled recruitment as arranged by the United States Employment Service of the War Manpower Commission and would subscribe to advertising at recruiting points.

5. Housing Facilities would be available for the workers upon their arrival on the project.

On August 11, 1943, a meeting was held by the Corps of Engineers and 30 persons were present, including representatives of the Corps of Engineers, War Manpower Commission, Clinton Engineer Works Contractors, and of State Selective Service. The Corps of Engineers was represented by Lt. Col. Crenshaw, Lt. Col. George, Major Swanson, Capt. Gregor, Major Travis, Major Shackelford, J. Maherty, and W. J. Hatfield; Col. Crittenden represented the Tennessee State Selective Service; Tate, Clift and Cow represented the War Manpower Commission. The only major contractor not represented was Stone & Webster Engineering Corporation. H. D. Reese, Jr., represented du Pont Company. An explanation was made of the modified priority held by the Clinton Engineer Works and of the procedure to be followed by the recruitment of common labor for the project.

Tate advised that the War Manpower Commission was in the process of cancelling all scheduled itineraries made by out-of-region employers which involved the recruitment of laborers or trainees. In spite of this action on the part of the War Manpower Commission, employment offers to trainees continued to be made by out-of-region employers, when recruiting other classifications of labor and relief due to the competition of the higher wage scale offered trainees who, in general, were not required to have any qualifications other than those required for common labor, was not obtained to any great extent.

Lt. Col. Crenshaw discussed recruitment and brought up the fact that during the previous weeks the combined efforts of all the contractors caused the recruitment of 5000 common laborers on this project and he also stressed that during the same period 2500 common laborers were terminated. Additional statistics revealed that the common laborers were being recruited at greatly increased numbers over those recruited during the period of the original priority but this was explained by the fact that a greater number of recruiting parties were in the field during this period than during the time that the original priority was in existence. The attitude of the War Manpower Commission was that the necessity for restoring the priority did not exist in that a sufficient number of laborers was being recruited for the project but that the Corps of Engineers and the contractors were not devising means to hold the laborers on the job and that, until evidence has been produced to prove that every possible effort has been made to hold recruited laborers on the job, consideration would not be given for the restoration of the absolute priority. Absenteeism was also stressed.

Col. Crittenden discussed Selective Service and stated that it was his understanding that approximately 100 laborers were taken into the Armed Services each week and he advised that, because of the urgent need for common laborers on this project, deferments could be obtained for this group. However, the number of laborers terminated for military service on the du Pont Project was only a small percentage of the total and the Company did not feel that it was necessary to request draft deferments for this group.

The subject of regional recruitment was discussed and the War Manpower Commission pointed out that no special consideration could be given on out-of-region recruiting and that requests for clearances into other regions might not be approved by the region involved.

A discussion was started relative to the advantages and disadvantages of "bush beating" and Tate definitely informed the meeting that "bush beating" would not be permitted. Lt. Col. Crenshaw asked Tate if it would not be possible for the local United States Employment Service employees to do "bush beating" for the contractors' recruiters, and Tate explained that this was possible but that insufficient personnel was available in the War Manpower Commission and the United States Employment Service. Lt. Col. Crenshaw suggested that he might loan the War Manpower Commission the necessary personnel to perform "bush beating" tactics for the contractors, but Tate advised that this personnel was not on their payroll and therefore could not work as desired. It was revealed that inadequate funds prohibited the employment of additional personnel by the War Manpower Commission and the United States Employment Service, and that it would take an "Act of Congress" to obtain more funds.

The War Manpower Commission suggested that Civil Service employees might be able to perform the "bush beating" and Lt. Col. Crenshaw stated that, if Mr. Tate would supply him with the number of people required to satisfactorily perform the job, he believed that he could obtain adequate personnel.

The Company made a study of terminations during construction expansion and it was revealed that 45% of the laborers terminated worked less than one week and that 50% of the laborers terminated worked from one week to one month and that only 5% of the laborers terminated after working one month.

On August 30, 1943, John Flaherty remarked, relative to our recruiting success, to the effect that the du Pont recruiting parties did not succeed in recruiting as many laborers as the parties of other contractors of the Clinton Engineer Works and that it was his recommendation that the Company immediately increase its newspaper advertising. H. D. Reese, Jr., advised him that, if it were the opinion of the Corps of Engineers that continuous advertising should be run during the periods of recruitment, the Company would be pleased to comply but that our experience did not reveal that newspaper advertising was of sufficient value to warrant daily advertising. Flaherty could not make any other recommendations as to what could be done by du Pont recruiters in order to obtain more men and still comply with the Corps of Engineers' instructions that the Company, to the fullest extent, follow the War Manpower Commission's recruiting procedures.

Flaherty expressed some concern over the fact that the du Pont Company project had a labor craft turn-over of more than three and one-half times that of the project as a whole and quoted the following figures:

Du Font Turn-Over	29.0%
Stone & Webster Turn-Over	5.6%
O'Driscoll & Grove Turn-Over	2.3%
Turn-Over for Project	2.0%

M. D. Reese, Jr. reminded him that the Company was very deeply concerned about the high rate of turn-over and that it had been suggested that an Army Officer be assigned to the Company's Exit Interviewer's Office in order that an attempt might be made through the military to help control terminations and that it was the attitude of the Corps of Engineers at that time that it did not want to be involved in this personnel problem. Reasons for terminations were required in the exit interview and are discussed under the topic "Terminations".

Labor recruitment became more difficult during September and October 1943 and many of the places visited did not result in the employment of any individuals. It is believed that there are three apparent reasons responsible for this condition:

1. The available supply for legitimately recruited labor was depleted.
2. The so-called Tennessee Priority appeared to have been discarded by most of the United States Employment Service Offices in this region.
3. Proper clearance had not been obtained into some of the towns requested although the Company had been informed that such clearance had been approved.

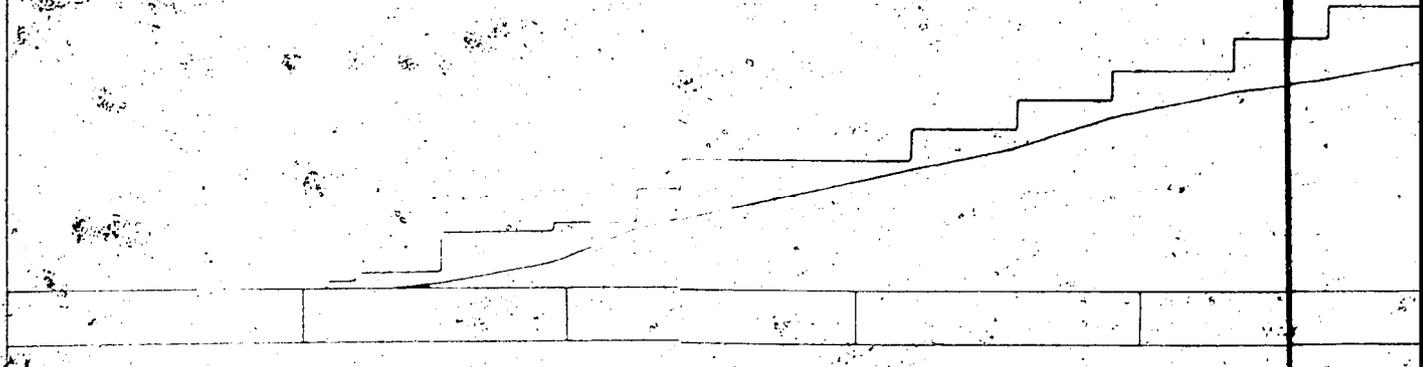
The common reason given by men for their refusal to accept the Company's offer of employment was the wage rate schedule established for this project. The shipyards and other companies were offering laborers and trainees rates of pay considerably in excess of that scheduled for this project. In general, the wages in the cities recruited ranges from 35 cents to 45 cents per hour. Considerable difficulty was encountered in the "pirating" of labor by other companies when du Font was the only one who had clearance to recruit.

The last requisition for common laborers was filed on September 30, 1943, and was filled on October 12, 1943. At that time, Major J. F. Shaskellford, of the Office of the Area Engineer, requested du Font to continue recruitment on previously approved itineraries scheduled after November 3, 1943, and to turn over to the Stone & Webster Engineering Corporation all excess recruited laborers. No charge or billing was made against the Stone & Webster Engineering Corporation for the laborers so recruited as instructed by the Area Engineer's Office. A total of 251 excess laborers were turned over to the Corporation. A number of local common laborers were re-employed after October 12, 1943, who previously worked on the project and whose services were rejected by the Armed Forces of the Nation.

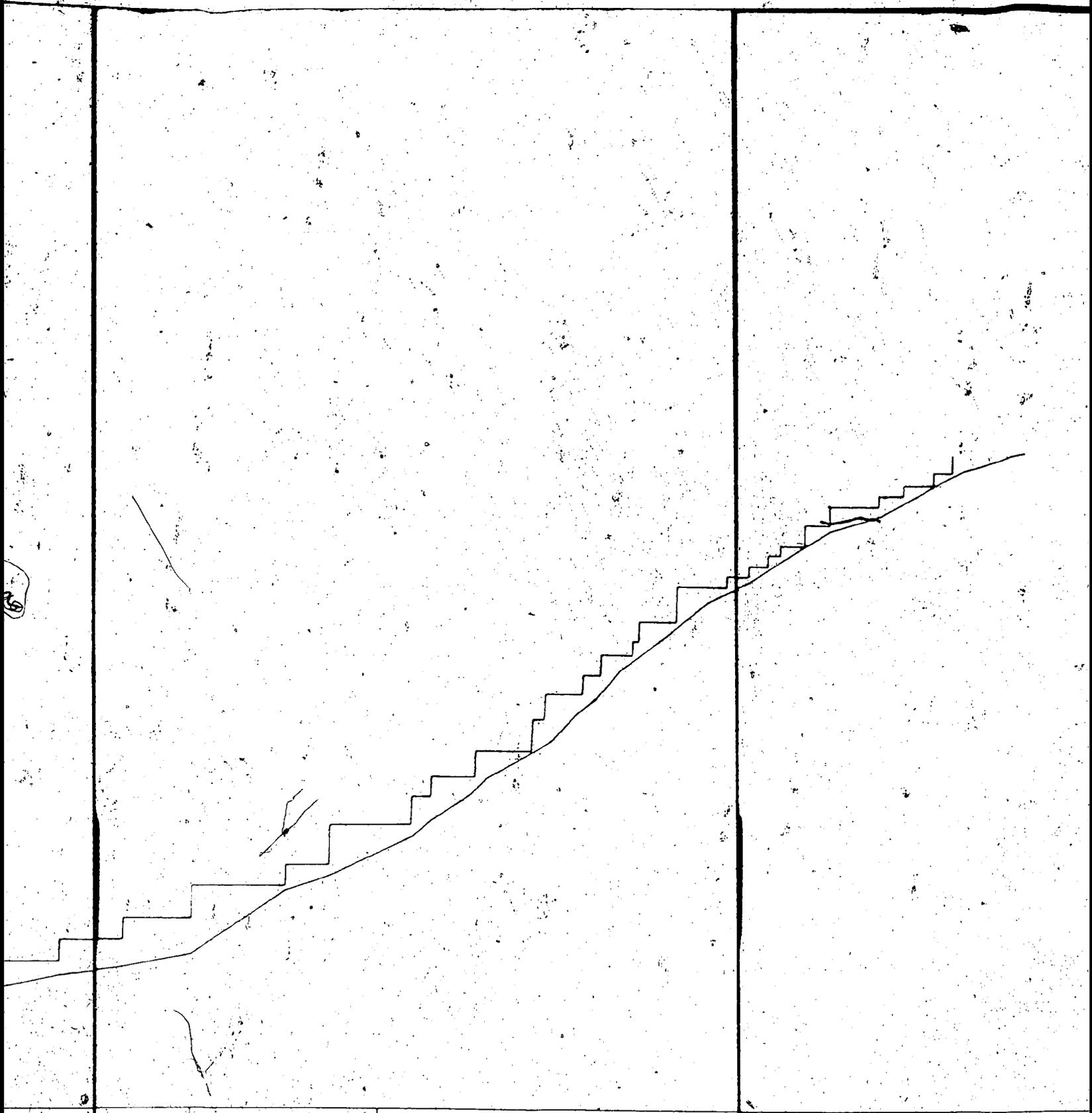
The accumulative total of requisitions placed for common labor was 3,211. On October 7, 1943, a cancellation of a portion of the

3.500
3.000
2.500
2.000
1.500

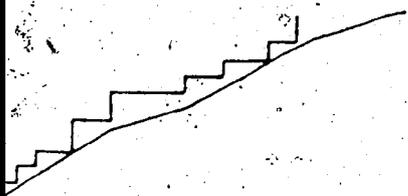
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AC



ACCUMULATIVE EMPLOYMENT OF COMMON LABOR



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outstanding requisitions for common labor was made reducing the total number requested by 18. The net number requisitioned was 3,193. A graphical representation of the placing and filling of requisitions is shown on page 92. The chart indicates that the rate of employment of common labor increased about June 1, 1943. From the start of the project to June 1, 1943, approximately 750 laborers were employed and from June 1, 1943 through October 12, 1943, when all outstanding requisitions were filled, a total of 2,061 were employed. The increased rate of employment was due to the recruitment effort. Prior to June 1, 1943, the rate of employment was approximately 6 1/2 laborers per calendar day; the rate from June 1, 1943 through October 12, 1943 was approximately 15 laborers per calendar day.

The outside recruiting crews numbered 9 at the peak with 2 men on local recruitment. The labor recruitment program was closed on November 9, 1943, with the termination of J. P. Devine and D. G. Brady, last of the recruiters. The cost of outside common labor recruitment was approximately \$45,970, which included all salaries and expenses such as transportation, printing and advertising, as well as fees of local physicians employed to give physical examinations. The average cost per recruited man was approximately \$28.

The total number of common laborers employed by means of outside recruitment was 1,478 and the number hired locally was 1,685. In addition to these, 89 laborers were obtained from the surplus recruited by J. A. Jones Construction Company. Of these, 1,829 were colored people. Negroes were only employed in the capacity of laborers and janitors.

The following tabulation is a list of the municipalities in which recruitment took place and also shows the net number actually reporting to the Company at Knoxville, Tennessee for work from each.

LOCATION AND RESULTS OF OUTSIDE LABOR RECRUITMENT PROGRAM

DATE	LOCATION	LABORERS REPORTED	DATE	LOCATION	LABORERS EMPLOYED
MAY 20	GRININ, MISS.	6	JUN 21	SOMERSET, KY.	0
" 21	GRININ, MISS.	6	" 22	SOMERSET, KY.	5
" 22	TUFELD, MISS.	11	" 24	MC MINNIEVILLE, TENN.	1
" 24	GRININ, MISS.	11	" 25	CHATTANOOGA, TENN.	2
" 25	CLARKSDALE, MISS.	11	" 25	CHATTANOOGA, TENN.	5
" 26	SARDIS, MISS.	5	" 26	CORDELE, GA.	0
" 28	COLUMBUS, MISS.	0	" 26	CHATTANOOGA, TENN.	0
" 31	MEMPHIS, TENN.	6	" 28	CORDELE, GA.	3
JUNE 1	MEMPHIS, TENN.	6	" 28	CHATTANOOGA, TENN.	7
" 3	NASHVILLE, TENN.	1	" 29	ALBANY, GA.	0
" 4	NASHVILLE, TENN.	2	" 29	ALBANY, GA.	10
" 5	NASHVILLE, TENN.	2	JULY 5	ATLANTA, GA.	5
" 6	MEMPHIS, TENN.	2	" 6	MEMPHIS, TENN.	0
" 7	MEMPHIS, TENN.	3	" 6	ATLANTA, GA.	11
" 8	MEMPHIS, TENN.	3	" 7	MEMPHIS, TENN.	4
" 9	MEMPHIS, TENN.	3	" 7	ATLANTA, GA.	10
" 10	MEMPHIS, TENN.	13	" 7	MEMPHIS, TENN.	15
" 11	MEMPHIS, TENN.	16	" 8	ATLANTA, GA.	2
" 12	GREENVILLE, S. C.	0	" 8	MEMPHIS, TENN.	4
" 12	MEMPHIS, TENN.	1	" 8	JACKSON, TENN.	0
" 14	GREENVILLE, S. C.	2	" 9	ATLANTA, GA.	6
" 14	MEMPHIS, TENN.	19	" 9	SARDIS, MISS.	0
" 15	GREENVILLE, S. C.	9	" 10	JACKSON, TENN.	9
" 15	ROCK HILL, S. C.	0	" 10	SARDIS, MISS.	20
" 15	MEMPHIS, TENN.	0	" 10	JACKSON, TENN.	21
" 16	ROCK HILL, S. C.	0	" 12	BIRMINGHAM, ALA.	7
" 16	ANDERSON, S. C.	0	" 13	BIRMINGHAM, ALA.	12
" 17	ANDERSON, S. C.	0	Declared Critical Area, Remain- der of clearance cancelled.		
" 18	COLUMBIA, TENN.	0	" 15	JOHNSON CITY, TENN.	10
" 18	GREENWOOD, S. C.	0	" 16	ELIZABETHTON, TENN.	3
" 18	COLUMBIA, TENN.	0	" 16	NEWPORT, TENN.	3

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JULY 17	NEWPORT, TENN.	8
" 19	CHATTANOOGA, TENN.	6
" 20	JOHNSON CITY, TENN.	15
" 21	CHATTANOOGA, TENN.	6
" 21	JOHNSON CITY, TENN.	6
" 21	CORINTH, MISS.	8
" 21	CHATTANOOGA, TENN.	4
" 21	JOHNSON CITY, TENN.	5
" 22	CHATTANOOGA, TENN.	0
" 22	CHATTANOOGA, TENN.	1
" 23	CHATTANOOGA, TENN.	10
" 23	MS MINNIEVILLE, TENN.	7
" 24	ROCKWELL, MISS.	0
" 24	MS MINNIEVILLE, TENN.	4
" 24	ROCKWELL, MISS.	6
" 26	SPRINGFIELD, TENN.	0
" 26	COCKEVILLE, TENN.	9
" 27	MEMPHIS, MISS.	0
" 27	CLARKSVILLE, TENN.	0
" 27	DYERSBURG, TENN.	7
" 27	COCKEVILLE, TENN.	10
" 28	MEMPHIS, MISS.	3
" 28	CLARKSVILLE, TENN.	9
" 28	ROCKWELL, TENN.	2
" 28	ROCKWOOD, TENN.	0
" 28	MEMPHIS, MISS.	0
" 29	SPRINGFIELD, TENN.	0
" 29	JACKSON, TENN.	4
" 29	ROCKWOOD, TENN.	0
" 29	COLUMBUS, MISS.	0
" 30	SPRINGFIELD, TENN.	10
" 30	JACKSON, TENN.	11
" 30	LOUISON, TENN.	0
" 30	COLUMBUS, MISS.	22
" 31	NASHVILLE, TENN.	4
" 31	JOHNSON CITY, TENN.	9
" 31	JACKSON, TENN.	0
" 31	LOUISON, TENN.	0

JULY 31	SARDIS, MISS.	0
" 31	NASHVILLE, TENN.	11
AUG. 2	JACKSON, TENN.	3
" 2	ATHENS, TENN.	3
" 2	SARDIS, MISS.	18
" 2	NASHVILLE, TENN.	8
" 2	ATLANTA, GA.	13
" 2	PULASKI, TENN.	0
" 2	MEMPHIS, TENN.	1
" 2	UNION CITY, TENN.	0
" 2	KINGSPORT, TENN.	0
" 3	PULASKI, TENN.	0
" 3	ATHENS, TENN.	0
" 3	UNION CITY, TENN.	33
" 3	KINGSPORT, TENN.	2
" 3	ATLANTA, GA.	17
" 4	NASHVILLE, TENN.	5
" 4	PAYETTEVILLE, TENN.	0
" 4	CLEVELAND, TENN.	0
" 4	PARIS, TENN.	0
" 4	KINGSPORT, TENN.	4
" 4	ATLANTA, GA.	16
" 4	GALLATIN, TENN.	0
" 5	COCKEVILLE, TENN.	10
" 5	PAYETTEVILLE, TENN.	3
" 5	CLEVELAND, TENN.	0
" 5	PARIS, TENN.	0
" 5	KINGSPORT, TENN.	3
" 5	GALLATIN, TENN.	0
" 6	TULLAHOMA, TENN. (C)	0
" 6	CLEVELAND, TENN.	0
" 6	COLUMBIA, TENN.	0
" 6	KINGSPORT, TENN.	11
" 7	LEBANON, TENN. (C)	
" 7	TULLAHOMA, TENN. (C)	
" 7	CROSSVILLE, TENN. (CD)	
" 7	COLUMBIA, TENN.	3
" 7	KINGSPORT, TENN.	0

(C) Cancelled by U.S.K.S.
(CD) Cancelled by du Pont.

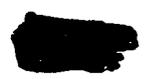
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 " 9 MEMPHIS, TENN.
 DALTON, GA.
 WASHINGTON, TENN.
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 " 10 DANVILLE, TENN.
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 WASHINGTON, TENN.
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 " 11 DANVILLE, TENN.
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 " 12 MEMPHIS, TENN.
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 " 13 ATHENS, GA.
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 " 14 ATHENS, GA.
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 ROCK HILL, S. C.
 " 16 ATHENS, GA.
 GREENVILLE, S. C.
 GRIFFIN, GA.
 ROCK HILL, S. C.
 " 17 GAINESVILLE, GA.
 GREENVILLE, S. C.
 GRIFFIN, GA.
 ROCK HILL, S. C.
 " 18 GAINESVILLE, GA.
 GREENVILLE, S. C.
 GRIFFIN, GA.
 " 19 COLUMBIA, S. C.
 GAINESVILLE, GA.
 GREENWOOD, S. C.
 LA GRANGE, GA.
 COLUMBIA, S. C.

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AUG. 19 MONROE, GA.
 " 20 GREENWOOD, S. C.
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 " 21 MONROE, GA.
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 " 22 COLUMBIA, S. C.
 " 23 ATLANTA, GA.
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 " 24 MC COMB, MISS.
 ATLANTA, GA.
 OPELIKA, ALA.
 " 25 MC COMB, MISS.
 ATLANTA, GA.
 ALEXANDER CITY, ALA.
 JAMESTOWN, TENN.
 HUNTSVILLE, ALA.
 " 26 HATCHES, MISS.
 ANDERSON, S. C.
 ALEXANDER CITY, ALA.
 JAMESTOWN, TENN.
 HUNTSVILLE, ALA.
 " 27 HATCHES, MISS.
 ANDERSON, S. C.
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 SPRINGFIELD, TENN.
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 " 28 VICKSBURG, MISS.
 ANDERSON, S. C.
 TALLAHASSEE, ALA.
 SPRINGFIELD, TENN.
 ATHENS, ALA.
 " 29 VICKSBURG, MISS.
 NEWPORT, TENN.
 MONTGOMERY, ALA.
 CLARKSVILLE, TENN.
 ATHENS, ALA.
 VICKSBURG, MISS.

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-28-



Aug. 30	GREENVILLE, S. C.	1
	COLUMBIA, S. C.	2
" 31	BROOKHAVEN, MISS.	0
	GREENVILLE, S. C.	1
	COLUMBIA, S. C.	9
	BROOKHAVEN, MISS.	0
	MEMPHIS, TENN.	3
	MONTGOMERY, ALA.	1
	CLARKSVILLE, TENN.	0
	DECATUR, ALA.	0
SEPT. 1	COOKSVILLE, TENN.	0
	MONTGOMERY, ALA.	6
	GREENVILLE, S. C.	6
	UNION CITY, TENN.	0
	COLUMBIA, S. C.	3
	DECATUR, ALA.	0
	BROOKHAVEN, MISS.	6
" 2	VICKSBURG, MISS.	1
	COOKSVILLE, TENN.	3
	SELMA, ALA.	0
	ROCK HILL, S. C.	3
	UNION CITY, TENN.	3
	COLUMBIA, S. C.	3
	DECATUR, ALA.	0
" 3	YAZOO CITY, MISS.	0
	MC MINNIEVILLE, TENN.	0
	SELMA, ALA.	0
	ROCK HILL, S. C.	8
	UNION CITY, TENN.	1
	COLUMBIA, S. C.	9
	GULLMAN, ALA.	0
" 4	YAZOO CITY, MISS.	0
	MC MINNIEVILLE, TENN.	1
	SELMA, ALA.	0
	ROCK HILL, S. C.	3
	UNION CITY, TENN.	0
	COLUMBIA, S. C.	27

SEPT. 4	GULLMAN, ALA.	0
	YAZOO CITY, MISS.	0
" 7	SPENCER, TENN.	0
	UNIONTOWN, ALA.	0
	DYERSBURG, TENN.	0
" 8	JACKSON, MISS.	0
	SPENCER, TENN.	0
	UNIONTOWN, ALA.	0
	DYERSBURG, TENN.	5
	JACKSON, MISS.	7
" 9	COLUMBUS, MISS.	2
	SPARTA, TENN.	5
	LIVINGSTON, ALA.	0
	JACKSON, TENN.	0
	JACKSON, MISS.	0
" 10	COLUMBUS, MISS.	3
	SPARTA, TENN.	0
	LIVINGSTON, ALA.	0
	JACKSON, TENN.	2
	TUPELO, MISS.	2
" 11	SARDIS, MISS.	0
	SPARTA, TENN.	0
	LIVINGSTON, ALA.	0
	JACKSON, TENN.	3
	TUPELO, MISS.	2
" 13	SARDIS, MISS.	5
	LIVINGSTON, TENN.	0
	DEMOPOLIS, ALA.	0
	MILAN, TENN.	1
	CORINTH, MISS.	3
	OXFORD, MISS.	13
	LIVINGSTON, TENN.	2
" 14	DEMOPOLIS, ALA.	0
	MILAN, TENN.	0
	CORINTH, MISS.	4
" 15	OXFORD, MISS.	0
	GAINESBORO, TENN.	0

..	SEP. 29	CORINTH, MISS.	2
		COLUMBIA, S. C.	8
		ATHENS, ALA.	2
		ATLANTA, GA.	1
..	" 30	COLUMBIA, S. C.	7
		ATLANTA, GA.	3
..	NOV. 1	COLUMBIA, S. C.	13
		ATLANTA, GA.	2
..	" 3	ATLANTA, GA.	7
..	" 4	ATLANTA, GA.	7
..	" 5	ATLANTA, GA.	7
..	" 6	ATLANTA, GA.	3
..	" 8	ATLANTA, GA.	7

• Excess Laborers turned over to Area Engineer.

(d) Subcontractor's Personnel

Two Cost-Plus-A-Fixed-Fee Subcontracts were awarded by du Pont for this project. B. F. Shaw Company, of Wilmington, Delaware, had a subcontract for furnishing labor and material for piping, and the Broadway Maintenance Corporation of Long Island City, N. Y. had a subcontract for furnishing labor only for the electrical work.

G. E. Williams, Superintendent for the B. F. Shaw Company, arrived on the project March 15, 1943. R. E. White, Pipe Engineer, a local man, was employed on April 13, 1943, and was made Assistant Superintendent on August 2, 1943. On March 18, 1943 the first journeymen steamfitters and plumbers reported for work.

The Company procured all of its craft personnel through the local Union, Plumbers and Steamfitters Local 102. B. J. Hannifin was the Business Manager of this local. As craftsmen were required, the Company advised the Union as to the number and classification wanted. The Union referred men seeking employment to the Company, giving them an introductory slip stating their name and classification. This slip provided passage onto the Reservation to the Subcontractor's Employment Office located at the northwest corner just outside the TNX Area. All prospective employees were required to fill out an application for employment. A release from the former employer was requested for each prospective employee. Almost all foremen were promoted from the ranks of craftsmen and only a few were hired in as foremen. Nine employees came from other projects on which the Company worked and only four were transferred here on the basis of paid expenses.

Of the office clerical help, only two were local employees. All of the field clerks were of local origin. The clerical force was small as the du Pont Company rendered this contractor with such services as handling payrolls, assisting in procuring and expediting critical materials, obtaining material on government transfer from excess, the receiving and storing of all materials, and the transporting of materials to the job site. The maximum number on the roll of the B. F. Shaw Company was 322 on August 31, 1943, and of these five were General Foremen, nine Steamfitter foremen, seven Plumber Foremen, 159 were Steamfitters, 20 Steamfitter Welders and 108 were Plumbers. A total of 581 were hired, of which approximately 10% were local employees.

J. E. Jacobson, Superintendent for the Broadway Maintenance Corporation arrived on the project March 2, 1943 and M. Lowenhardt, Assistant Superintendent arrived on June 2, 1943 and was terminated on June 15, 1943. He was replaced by S. I. McRoberts, who reported on June 28, 1943. S. I. McRoberts terminated on July 24, 1943. The duties of Assistant Superintendent was then assumed by E. L. Akard. The transfer expenses of J. E. Jacobson, M. Lowenhardt and S. I. McRoberts were borne by the Corporation.

On March 5, 1943, the first journeymen electricians reported for work. The Broadway Maintenance Corporation procured all of

its working craft personnel through the local Union having jurisdiction over this territory; namely, Local B-760, International Brotherhood of Electrical Workers. Paris Cox was the Business Representative of the Local.

Each man seeking employment was given a letter of introduction from the Union stating his name, Social Security Number, and work classification, such as apprentice or journeyman, which acted as a pass to get onto the Reservation to the Subcontractor's Employment Office maintained adjacent to the du Pont Project Site. All foremen and general foremen were promoted from the ranks of craftsmen and none were transferred in by the Company as part of its key personnel. Clerical help was negligible as the Company maintained only one clerk. This was due to the fact that the du Pont Company handled payrolls, furnished all materials and transported materials to the job site for the contractor. The maximum number on the roll of the Broadway Maintenance Corporation was 279 on September 19, 1943, of which 24 were Foremen, 7 were Linemen, 226 were Journeymen Electricians, 15 Apprentice Electricians, and 4 were Groundmen. A total of 362 were hired of which less than 10% were local employees.

Lump Sum Subcontractors brought in specialized personnel whenever necessary. Other help was obtained locally through the Union having jurisdiction over the type of labor involved. No clerical force was maintained on the project site by the various subcontractors and required reports were prepared by the respective supervisors. A list of the Lump Sum Subcontractors is tabulated hereafter and the maximum number of men employed by each:

<u>Subcontractor's Name</u>	<u>Maximum Number Employed</u>
Albert Bros. Contractors, Inc. Salem, Virginia	46
Armstrong Cork Company Atlanta, Georgia	19
Cement Gum Company, Inc. Allentown, Pennsylvania	25
Chattanooga Boiler & Tank Company Chattanooga, Tennessee	1
Chicago Bridge & Iron Company Philadelphia, Pennsylvania	7
Combustion Engineering Company Chattanooga, Tennessee	1
Emery Construction Company Knoxville, Tennessee	28
General Electric X-Ray Corporation Chicago, Illinois	1

Grinnell Company Charlotte, North Carolina	5
Houghton Elevator Company Philadelphia, Pennsylvania	4
J. D. Helton Roofing Company Chattanooga, Tennessee	10
J. S. Minana Merchantville, New Jersey	29
Johnson & Willard Knoxville, Tennessee	28
Layne-Central Company Memphis, Tennessee	3
Link-Belt Company Philadelphia, Pennsylvania	7
McCabe Construction Company Cincinnati, Ohio	23
O'Neill Exterminating Company Knoxville, Tennessee	1
The Rust Engineering Company Pittsburgh, Pennsylvania	14
Warner Elevator Company Cincinnati, Ohio	4
Young & Bertha Company Cincinnati, Ohio	4

3. Personnel working

(a) General

The data used in the following discussion was obtained from the records and reports of the Time Office and accumulated through December 11, 1943, at which date the project was substantially complete and immediately prior to the commencement of construction on authorized additions.

Adjustments have been made in the data for the periods during which the forces worked over the normal eight hour day. No changes were made for days worked for which time and one-half was paid. The force figures of Saturday were taken as representing the average daily force and absentees during the work week.

The construction force for the du Pont Projects at Clinton Engineer Works was made up of the employees of du Pont Company, of two Cost-Plus-A-Fixed Fee Subcontractors, B. F. Shaw Company and Broadway Maintenance Corporation, and a number of Lump Sum Subcontractors. Force curves of each of the foregoing groups are shown on page 105.

The overall construction force was maintained above 90% of the peak of 3,240 reached in the week ending August 21, 1943, during the period beginning August 6, 1943 and ending September 30, 1943.

The du Pont Company's Force attained 90% of its peak on August 5, 1943, and remained over this number until September 22, 1943. The maximum of 2,650 men employed was reached on August 21, 1943.

The number of employees of the Cost-Plus-A-Fixed-Fee Subcontractors reached 90% of its maximum on August 18, 1943 and maintained a force over this percentage until October 8, 1943. The peak of approximately 560 men was reached on September 18, 1943.

The combined forces of the Lump Sum Subcontractors at no time exceeded 160 men and reached this peak on July 24, 1943. The number of men working exceeded 100 during the period from May 31, 1943 to July 28, 1943.

It is to be noted that the forces of the du Pont Company reached a maximum at approximately two-thirds of the construction calendar period. The forces of the two Cost-Plus-A-Fixed-Fee Subcontractors also peaked at the same two-thirds point of their construction calendar period. The du Pont man power during this period of maximum employment was approximately 80%, the Cost-Plus-A-Fixed-Fee Subcontractors' Force was about 17% and the Lump Sum Subcontractors' force was approximately 3% of the total construction forces working on the project.

(b) Non-Manual

(1) Du Pont

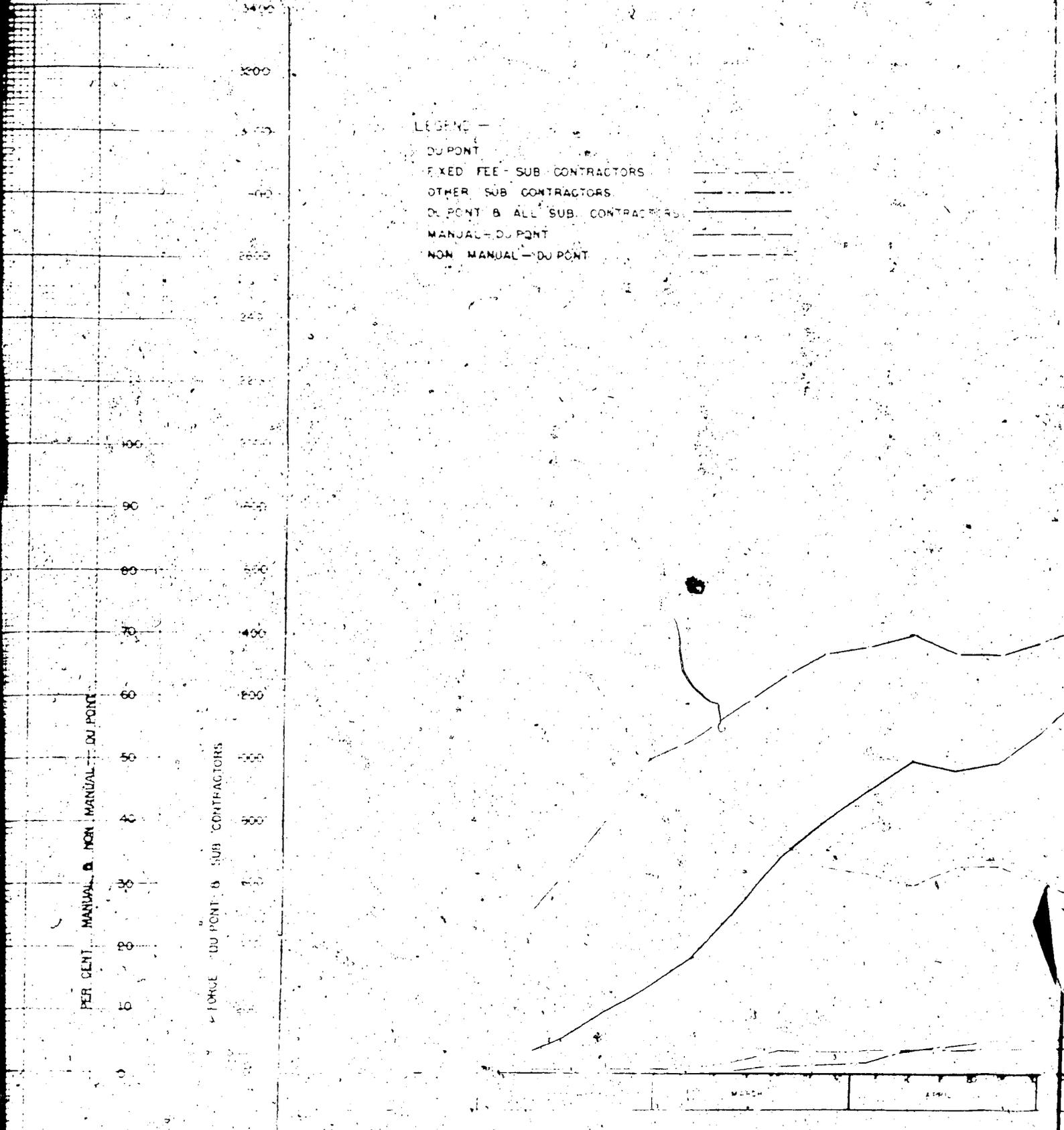
The construction force was divided into manual and non-manual

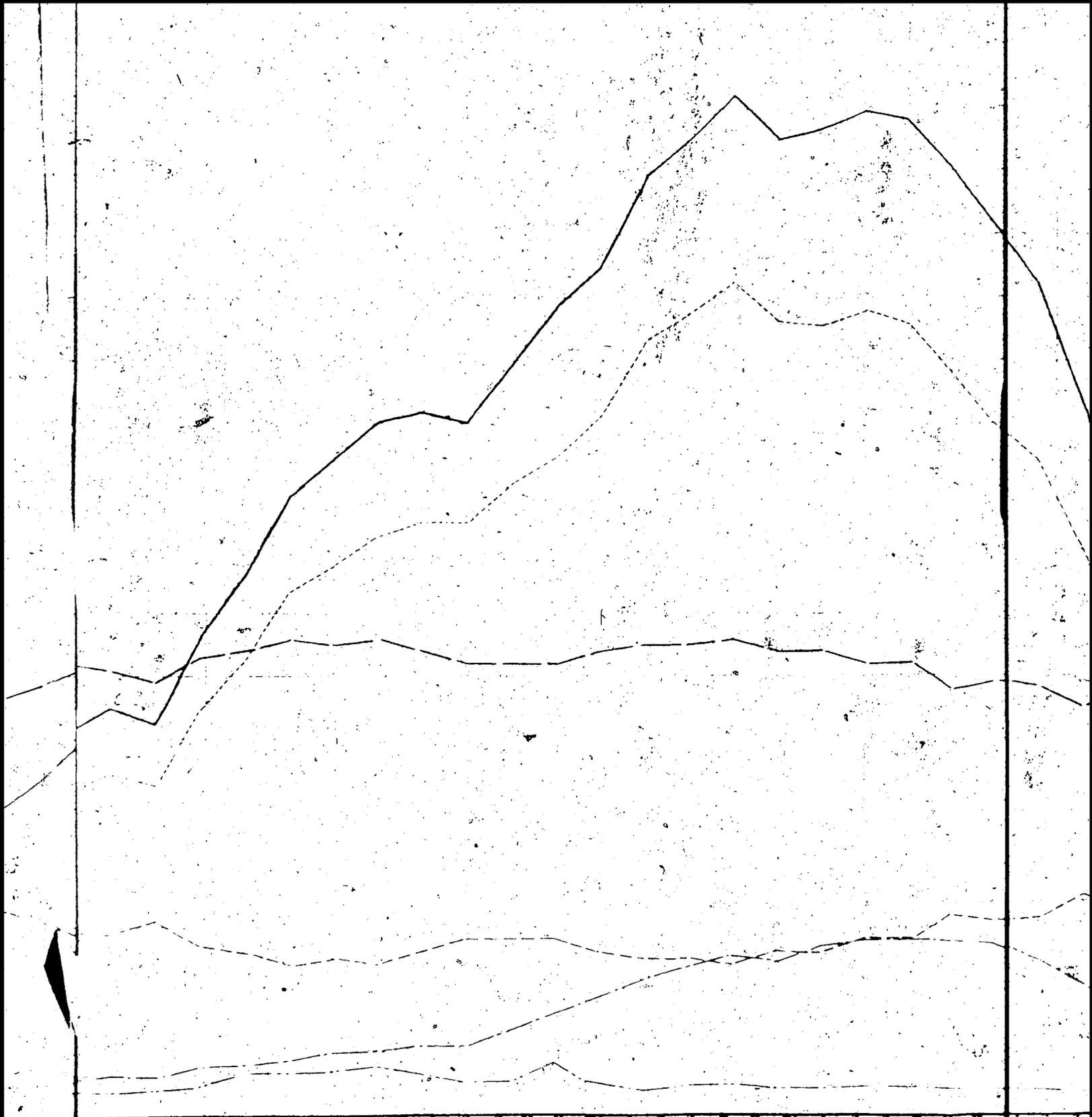
PER CENT MANUAL & NON-MANUAL - DU PONT

FORCE DU PONT & SUB CONTRACTORS

LEGEND -

- DU PONT
- FIXED FEE - SUB CONTRACTORS
- OTHER SUB CONTRACTORS
- DU PONT & ALL SUB CONTRACTORS
- MANUAL - DU PONT
- NON-MANUAL - DU PONT





MAY 25 30 JUNE 5 10 15 20 25 JULY 5 10 15 20 25 AUGUST 5 10 15 20 25 SEPTEMBER

FORCE CURVES
 CLINTON ENGINEER WORKS
 PROJECTS 9733 B 58

employees. The manual force was subdivided into direct and indirect; the direct force consisting of Mechanics, Helpers and Apprentices, and Laborers; the indirect force consisting of the Area Craft Superintendents, Gang Foremen for Mechanics and Gang Foremen for Laborers; the latter group were considered as non-manual inasmuch as they were a part of supervision.

The non-manual force was made up of employees of the Administrative, Accounting Department, Clerical Supervisor, Purchasing and Expediting, Receiving, MS Stores, Traffic, Personnel Employment, Reference, Medical, Patrol, Office Engineering, Cost, Contract, Time Office, Paymaster, Layout, and Safety, as well as Field Clerks, Craft Superintendents, Assistant Craft Superintendents, Field Engineers, and Field Inspectors.

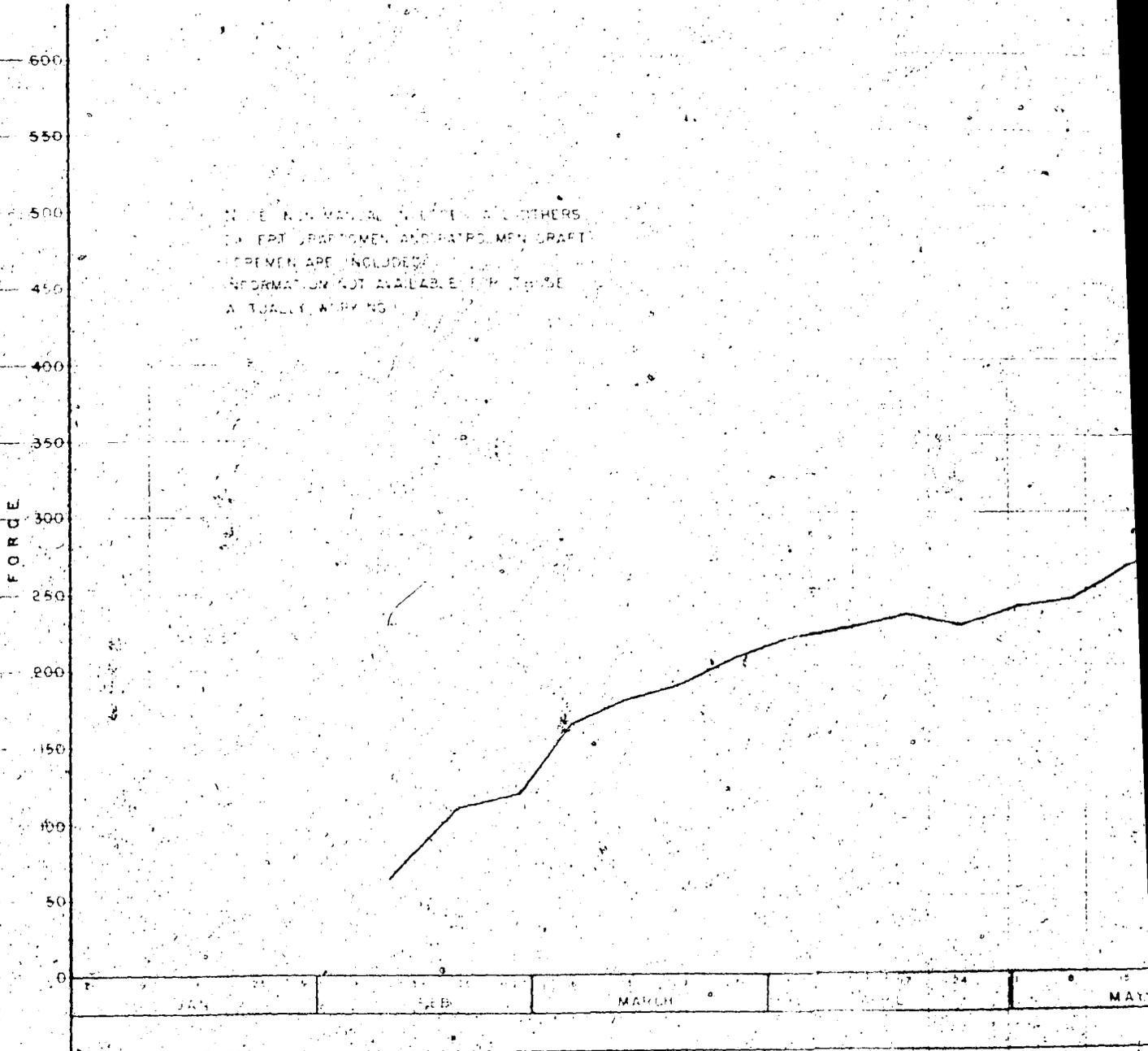
The maximum force of the non-manual group was reached during the week ending September 11, 1943. A graph of the non-manual force is shown on page 107 which does not include the employees of the Patrol Department. The maximum number of employees in the non-manual group not including the Patrol Department was approximately 535. From August 6, 1943 until October 14, 1943, the employment of this department was maintained above 90% of peak force. The total on roll man days of the non-manual force was 95,704 of which 24,537 man days were accounted for by Foremen. The approximate number of eight hour man days on roll was 98,856. Current records were not kept of absenteeism for all classifications in this group.

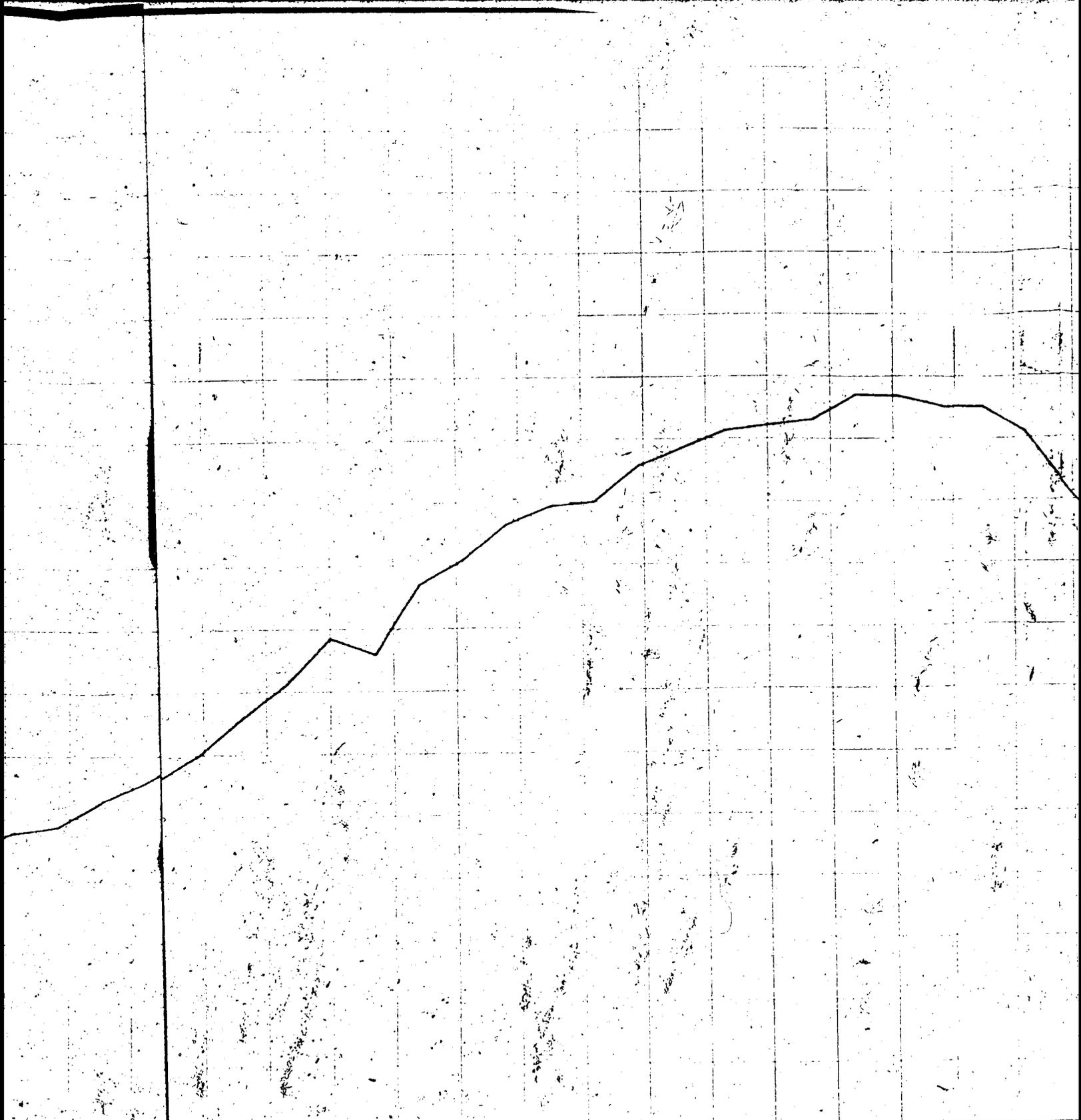
The Patrol Department was terminated from the construction payroll on October 18, 1943 and the personnel were immediately employed by Clinton Laboratories, the Operator of the plant for the Government, who assumed the responsibility for plant protection. Figures on absenteeism were available for the Department and the graph of the employment of the Patrol Department on page 108 shows the force on roll, working and percent of absenteeism.

The available man days from the start of the Project until the termination of this force on October 18, 1943 were 13,013. A total of 276 man days were lost by this department due to absenteeism. The peak force of the Patrol Department was 107 and was reached at the time the services of this department were discontinued from the construction organization.

Several of the Construction Departments were terminated as a group from the construction roll and immediately employed by the Clinton Laboratories. The respective heads were transferred to the TNX Roll.

On October 18, 1943 the Patrol Department was terminated as a group from the construction roll and employed by the Clinton Laboratories. Parker Fredericks, Supervisor of the Department, was placed on the TNX Roll on October 25, 1943. E. C. Leber, Chief Accountant, was transferred to the TNX Roll November 1, 1943. Other members of the Accounting Department, when terminated by du Pont were immediately offered employment by Clinton Laboratories. The Traffic Department personnel was also terminated

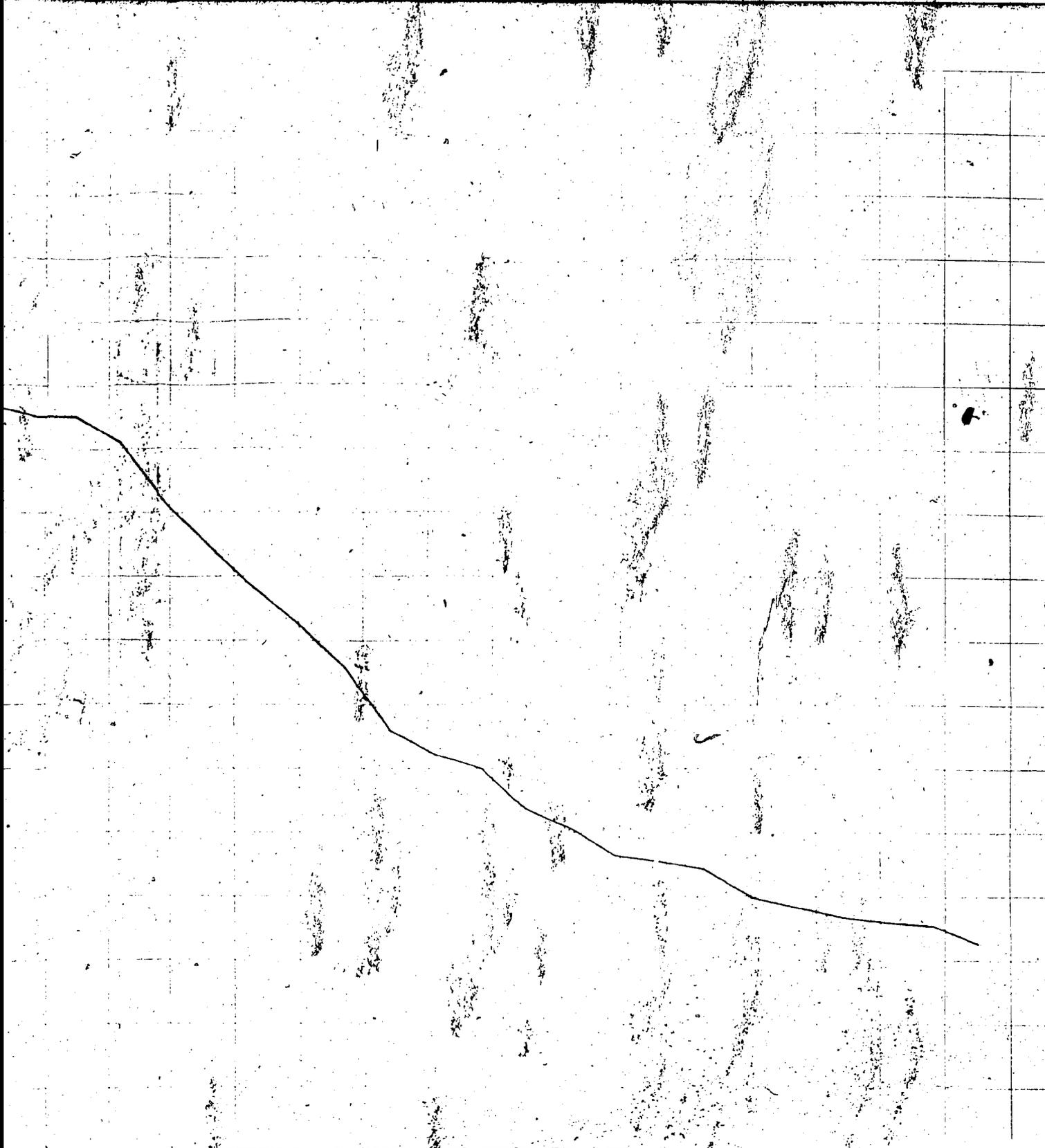




MAY 1 15 29 31 JUNE 5 12 19 26 30 JULY 7 14 21 28 31 AUG 4 11 18 25 31 SEPT 1 8 15 22 29 OCT 6 13 20 27

1943.

NON MANUAL EMPLOYMENT
 (DU PONT)
 CLINTON ENGINEER WORKS.
 PROJECTS 9733 & 58



21	7	9	14	21	30	6	13	20	27	3	10	17	24	31	7	14	21	28	4	11	18	25	1	8	15	22	29	5	12	19	26								
OCT										NOV										JAN										FEB									
1944																																							

PER CENT

FORCE

100

90

80

70

60

50

40

30

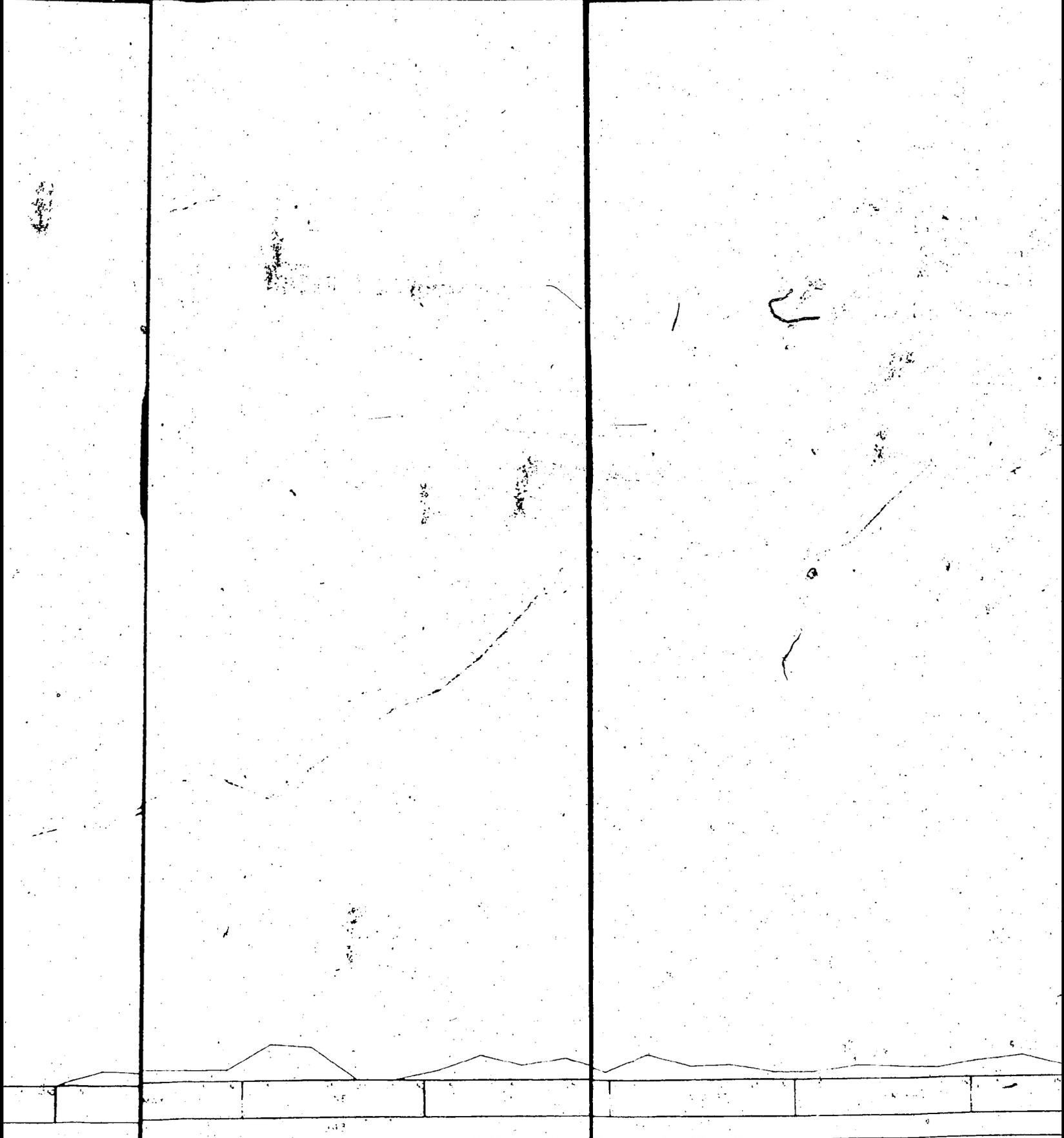
20

10

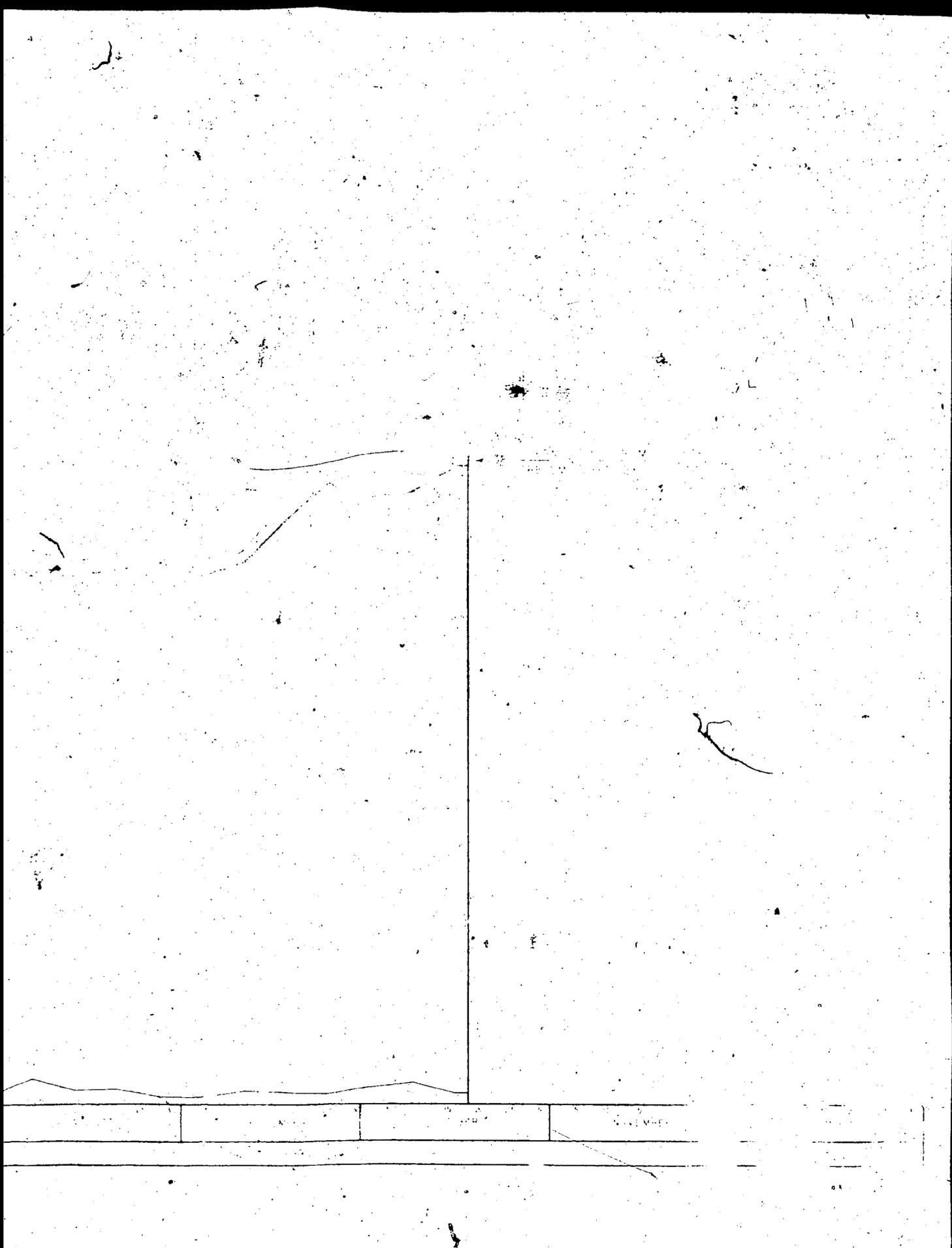
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	MARCH	APRIL	
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EMPLO



EMPLOYMENT OF PATROL DEPARTMENT
LINTON ENGINEER WORKS.



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[REDACTED]

and immediately employed by the Laboratories. F. C. Rose, Department Supervisor, was transferred to the TNX Roll on December 1, 1943. Effective November 1, 1943, the responsibility of operating the Telephone and Telegraph system on the plant site was assumed by the Clinton Laboratories.

The percent manual and non-manual employment of the du Pont Company throughout the construction period is shown graphically on page 105. It is to be noted that on May 4, 1943 the percent non-manual decreased to 30% and remained below this percentage for practically the entire period to September 22, 1943. The low point reached was approximately 24%. The graph is characteristic of construction projects in that at the start of this project, the percent non-manual was high and as force increased the percent decreased to a minimum and finally as the project was approaching completion the percentage of non-manual increased. A drop is noted during the week ending October 23, 1943. This was due to the termination of the Patrol Department from the construction force.

(C) Cost-Plus-A-Fixed-Fee Subcontractors

The non-manual force of Broadway Maintenance Corporation, Cost-Plus-A-Fixed Fee Subcontractor for the electrical work, consisted of a Superintendent, Assistant Superintendent, one Clerk and several foremen. The number of non-manual employees of this Company was small because of the services rendered by the du Pont Company as described under a preceding section. The maximum number working in this group was 28 and the force remained over 90% of the maximum from September 15, 1943 to October 15, 1943.

The total number of man days on roll of this non-manual force was 2,935, which when adjusted to a normal eight hour working day was equal to 3,460 eight hour man days. The eight hour man days worked were 3,369.

The rate of absenteeism was less than 3%. Only 91 eight hour man days were lost by the non-manual forces of this Company.

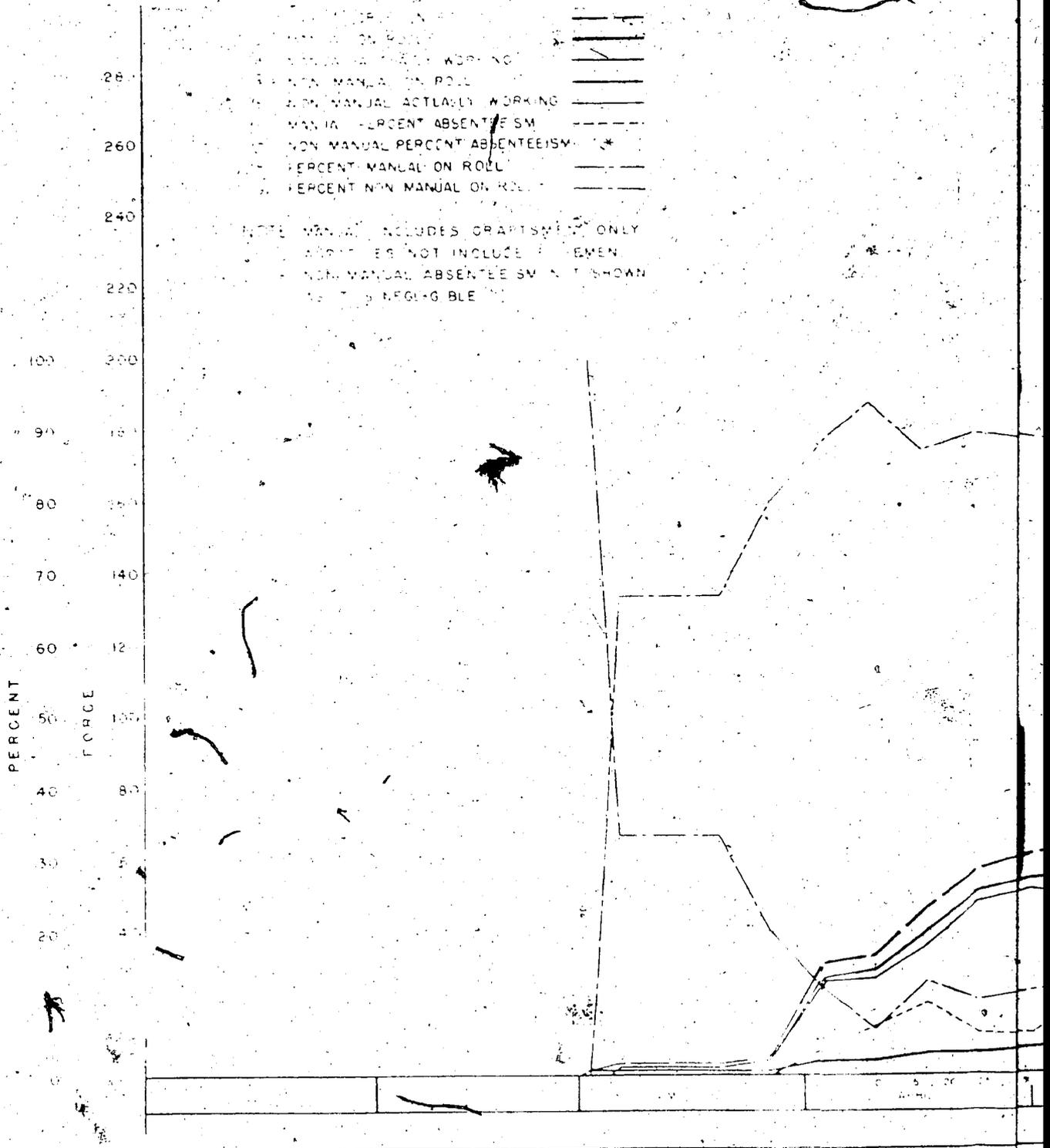
The percent of non-manual on roll did not exceed 15% during the period from April 2, 1943 to October 9, 1943 and reached a minimum of 2% on July 9, 1943. The average percent of non-manual during this period was approximately 10%. As the work was completed, the percent of non-manual forces rose gradually. Reduction of supervision was made in order to control the ratio of non-manual to manual forces working.

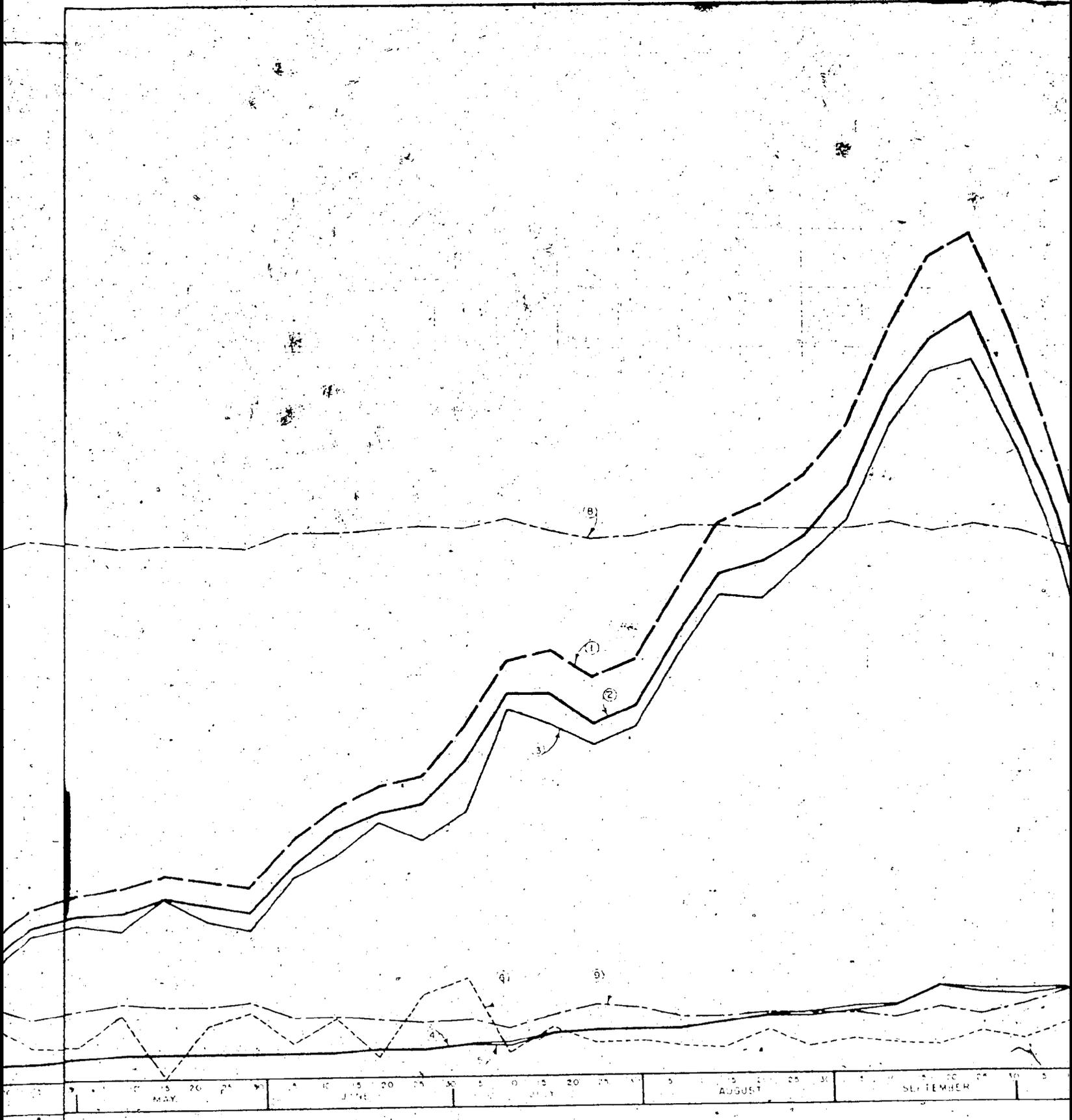
A force curve of the employment of the Broadway Maintenance Corporation appears on page 110.

The non-manual force of B. F. Shaw Company, Cost-Plus-A-Fixed-Fee Subcontractor for the piping on this project, was somewhat larger than that of the Broadway Maintenance Corporation because this company handled most of its own purchasing.

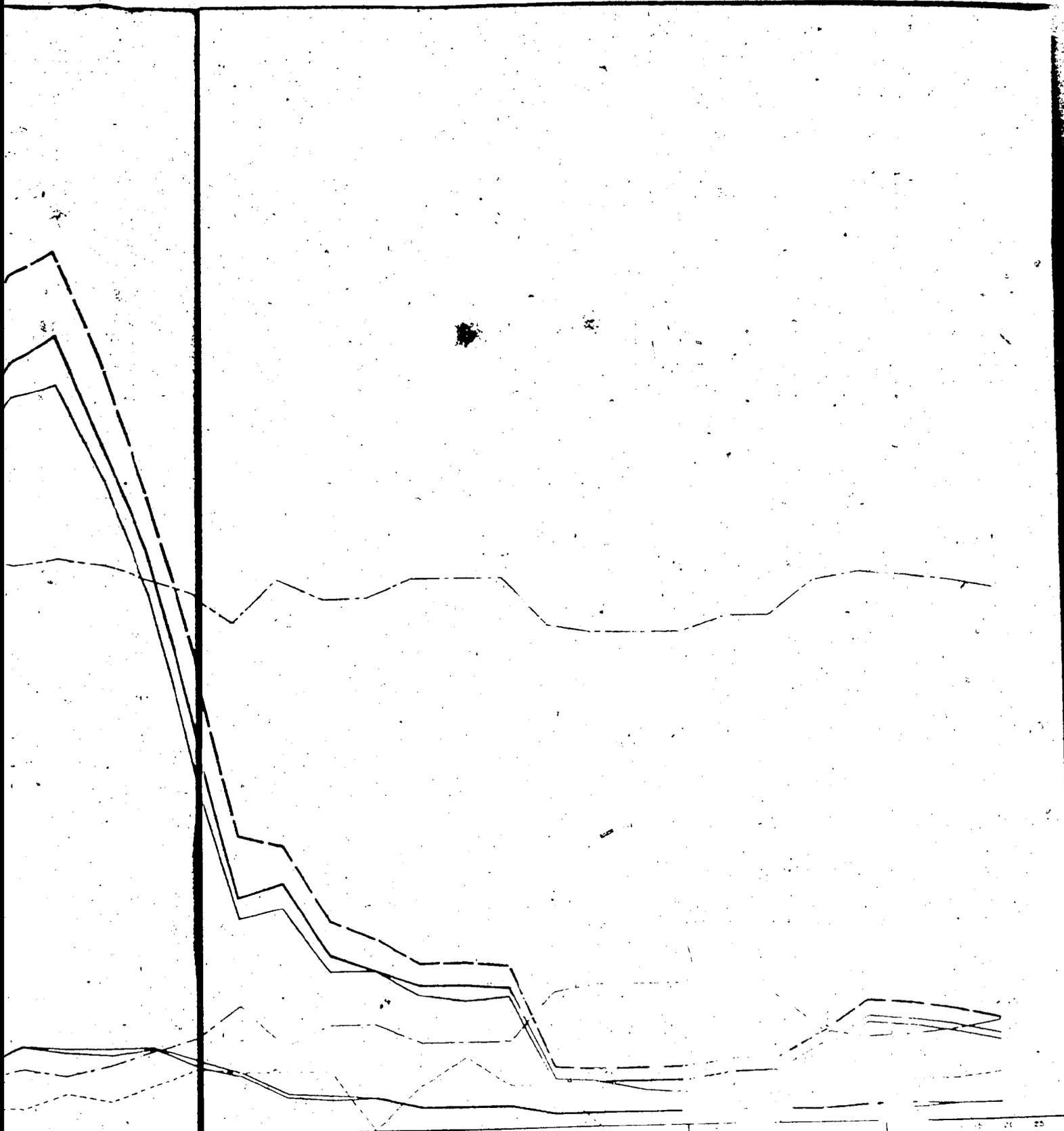
Maximum force of this group was reached during the Month of

[REDACTED]

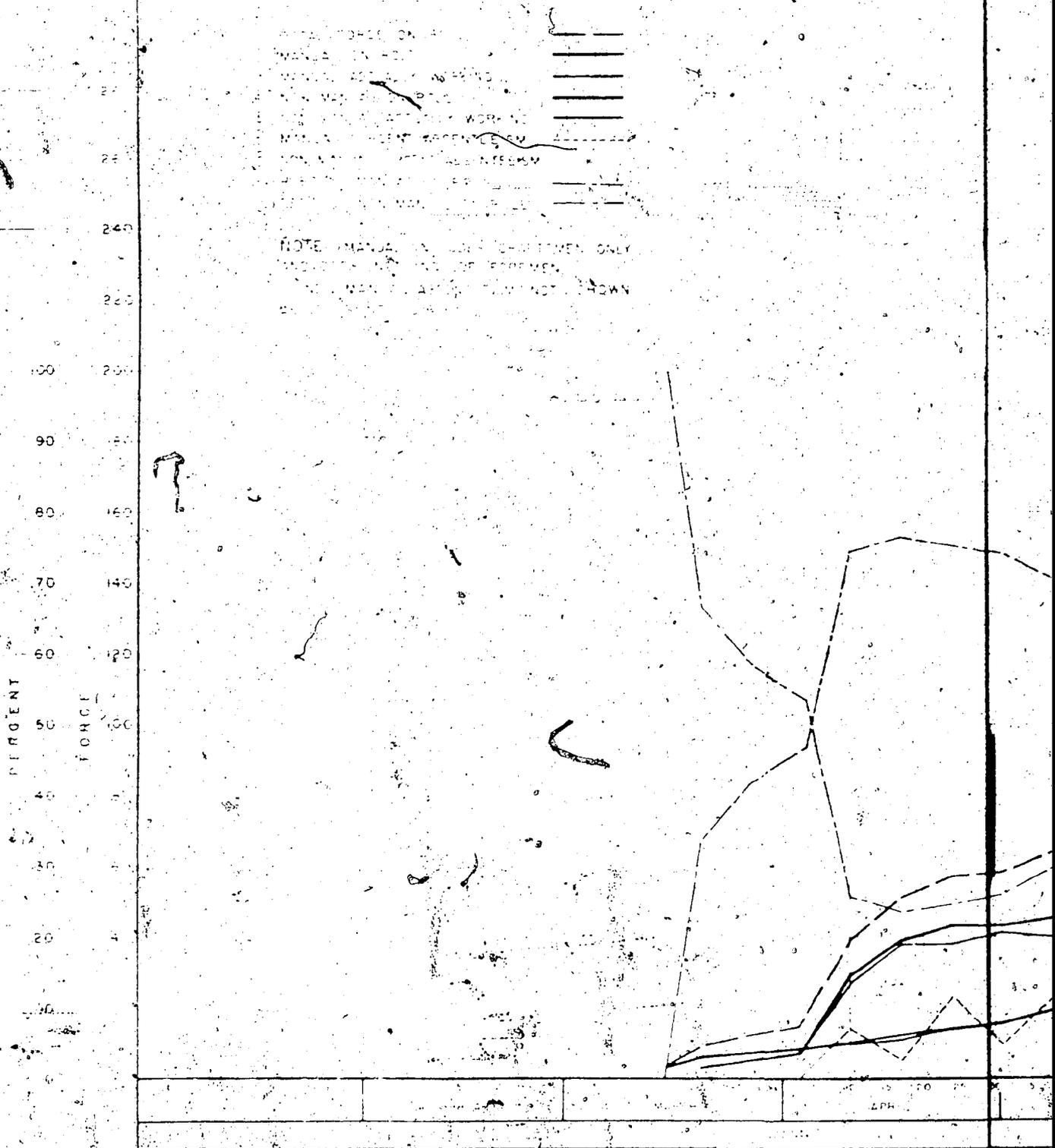


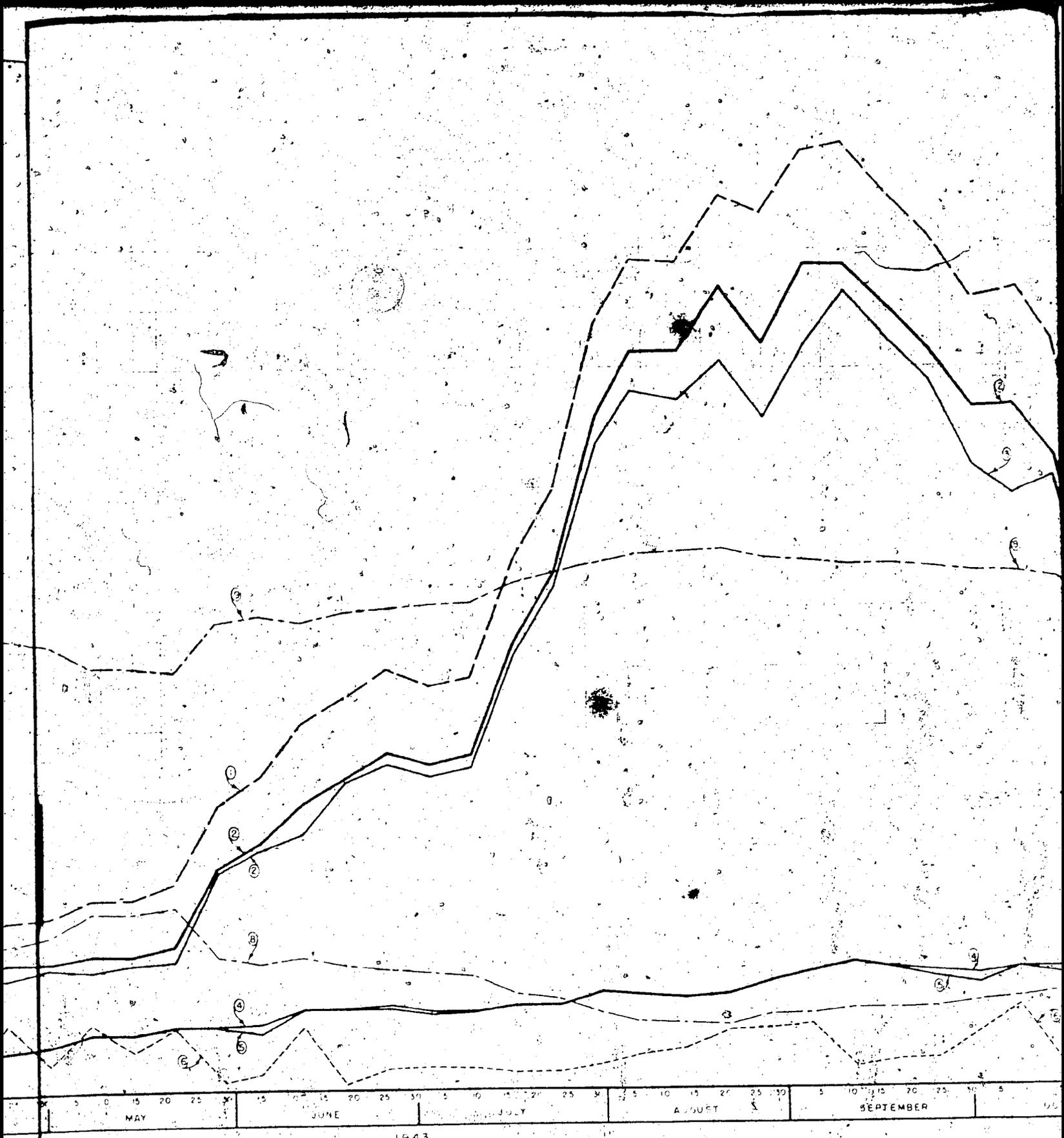


EMPLOYMENT OF BROADWAY MAINTENANCE CORP.
 (ELECTRIC)
 GLINTON ENGINEER WORKS
 PROJECT 9733 & 58

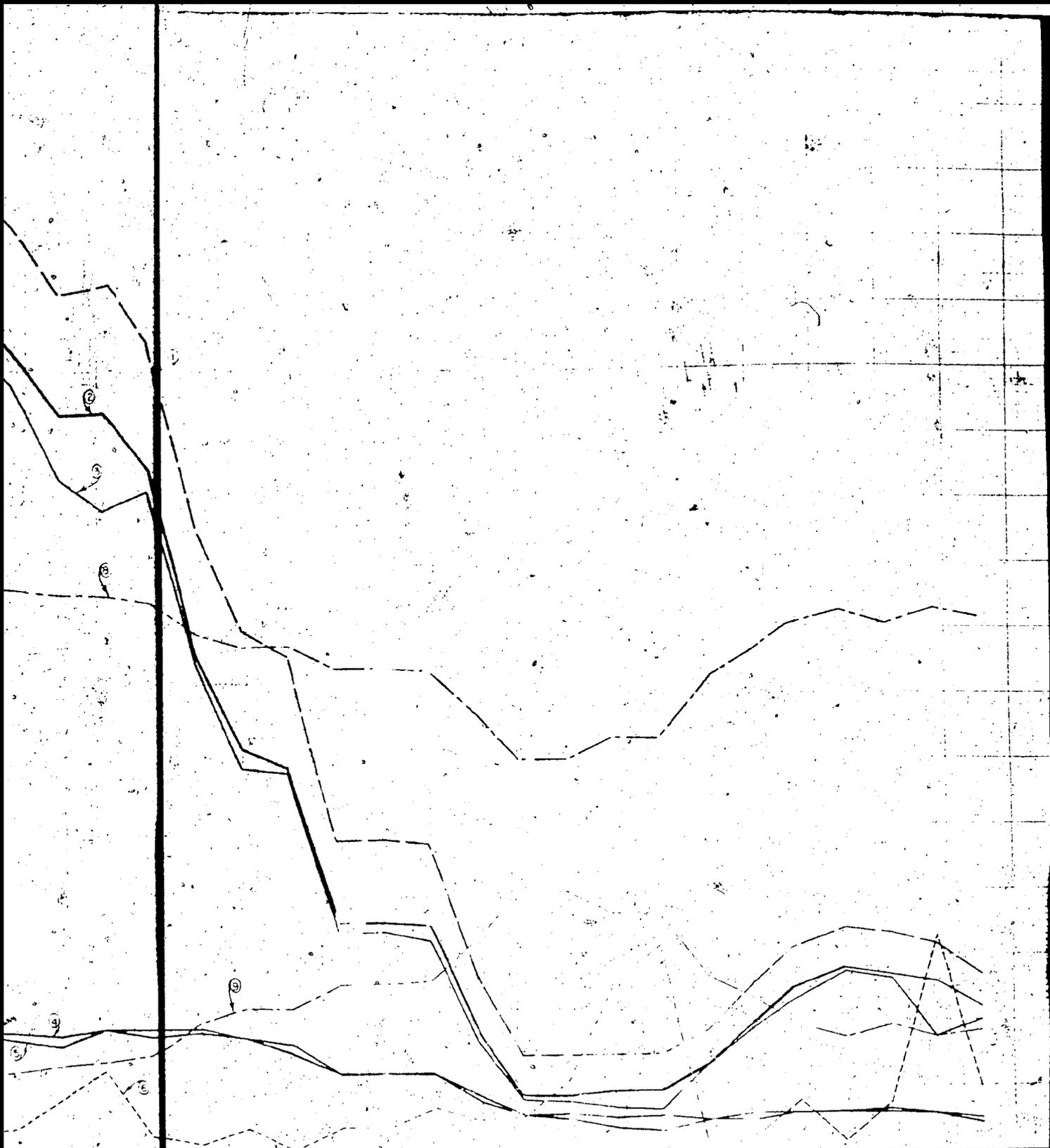


E. M. H. H.				FEARLIGHT 25





EMPLOYMENT OF B. F. SHAW
 (PIPING)
 CLINTON ENGINEER WORKS
 PROJECT 9733 & 58



25	20	15	10	5	0	5	10	15	20	25		
OCTOBER			NOVEMBER					JANUARY			FEBRUARY	
944												

September when the peak number on roll was 41. A force of over 90% of maximum was maintained throughout the Months of September and October.

The non-manual man days on roll were 5,931, which when adjusted to an eight hour working day, amounted to 6,948 man days. The eight hour man days actually worked were 6,856.

Absenteeism rate of the non-manual force of this Company was approximately 1.3%. The percent of non-manual on roll reached a minimum of approximately 11% during the Month of August.

Force curves of the employment of the B. F. Shaw Company are shown on page 111.

(c) Manual

(1) Du Pont

The direct manual force consisting of mechanics, helpers, apprentices and laborers was employed on this project as personnel of the various crafts; namely, Carpenter, Cement Finisher, Iron Worker - Structural, Iron Worker - Reinforcing, Labor, Millwright, Paint, and Transportation.

Carpenters were employed during the first week that the du Pont Employment Office on Cumberland Avenue in Knoxville, Tennessee was opened. The craft reached 90% of its peak force on August 3, 1943, and remained over that number until August 26, 1943. The maximum number on roll was 41 which peak was reached during the week ending August 21, 1943.

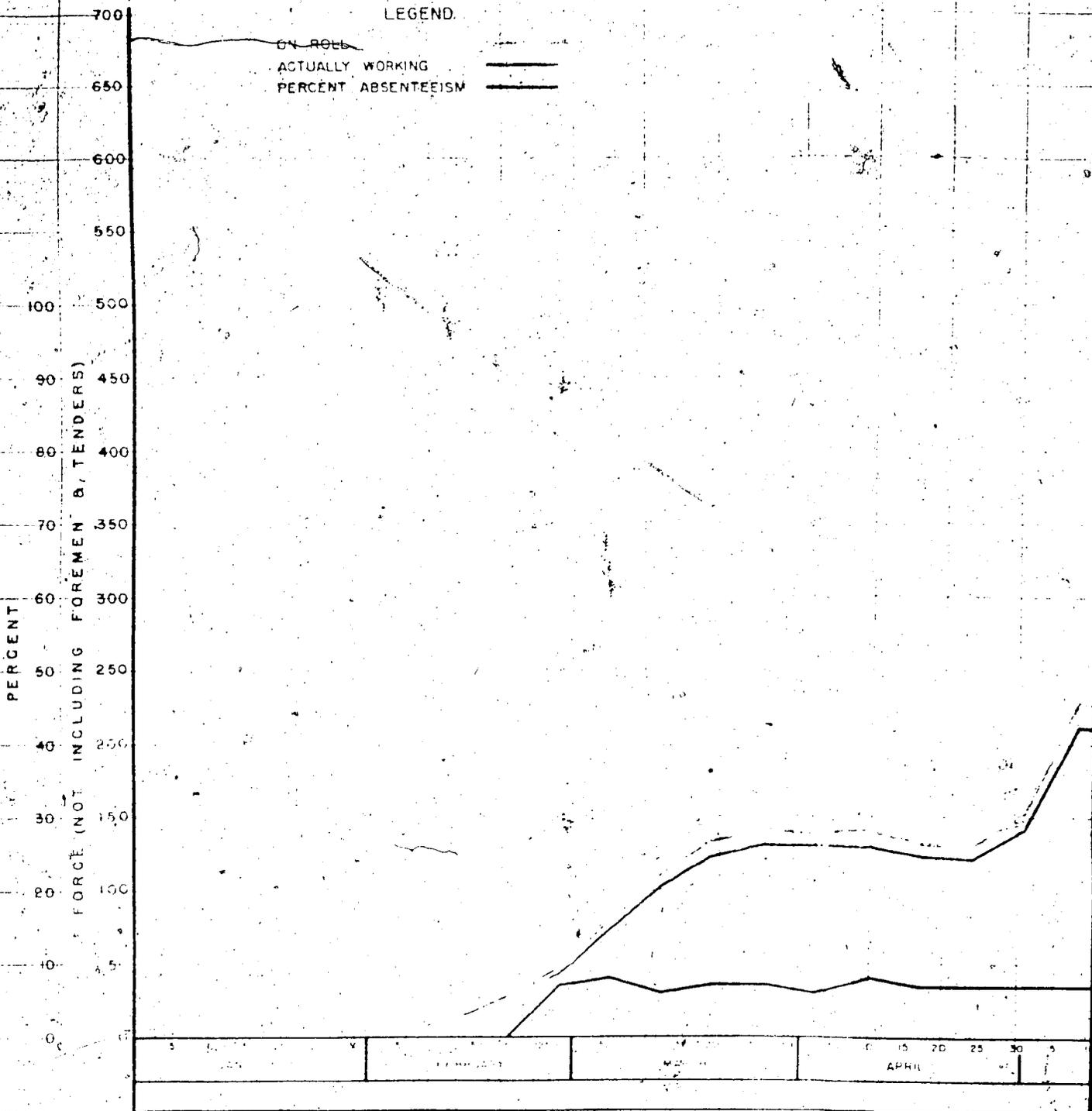
The number of on roll Carpenter man days from the beginning of the project through December 11, 1943 was 76,819 man days of all the various work day categories of the construction period, which number, when adjusted for work days of over eight hours duration increased to 90,578 hour man days. The number of adjusted eight hour man days actually worked was 81,361.

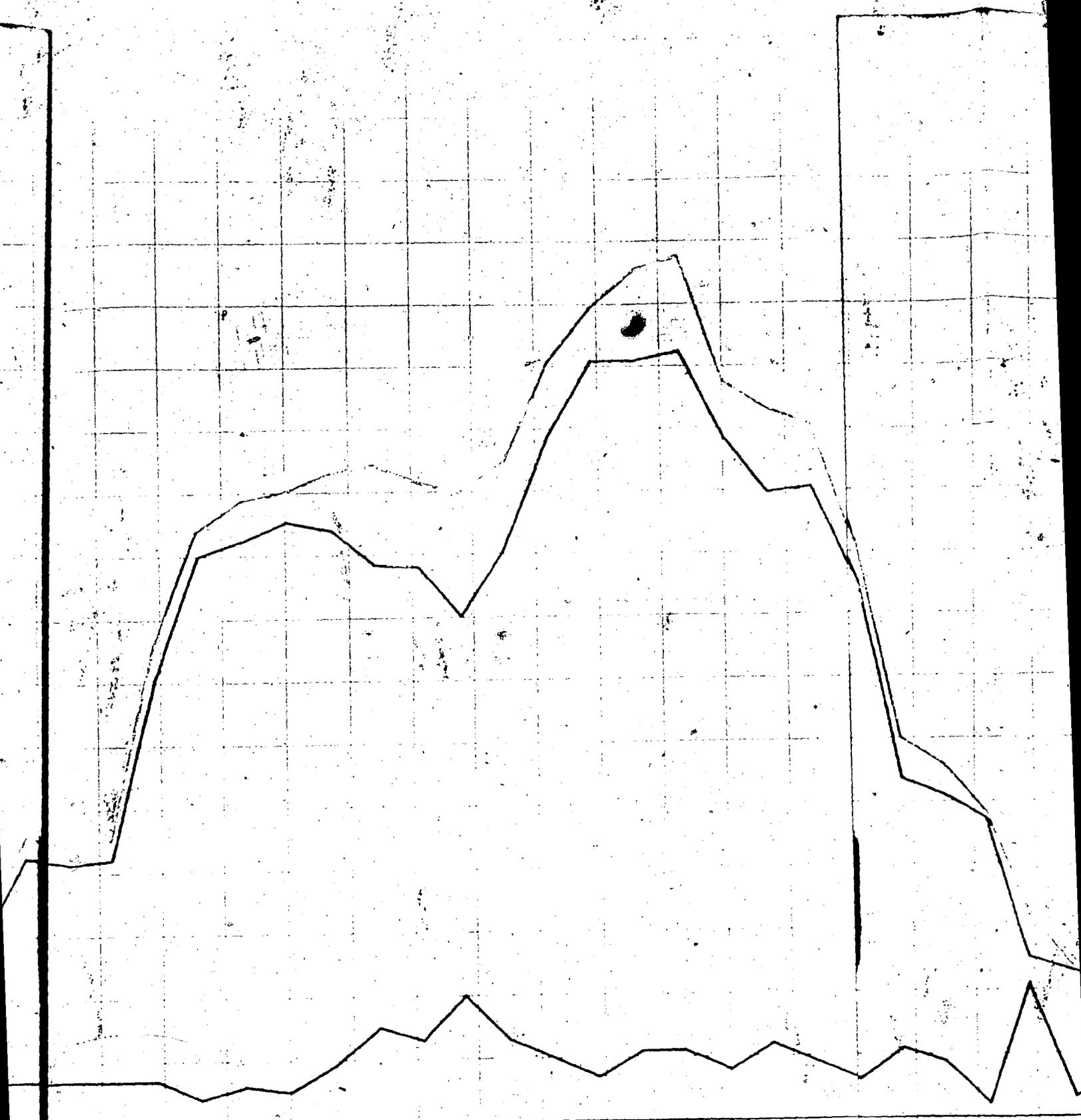
The average percent of craft absenteeism throughout the construction period was approximately 9.7%. A total of 6,696 man days were lost by this craft due to absenteeism.

The Carpenter Craft accounted for 30.3% of the total man days of work required for the substantial completion of this project by the du Pont manual forces, and for 24.9% of the manual forces of the du Pont Company and the Cost-Plus-A-Fixed-Fee Sub-contractors.

A force curve of the craft employment is shown on page 113.

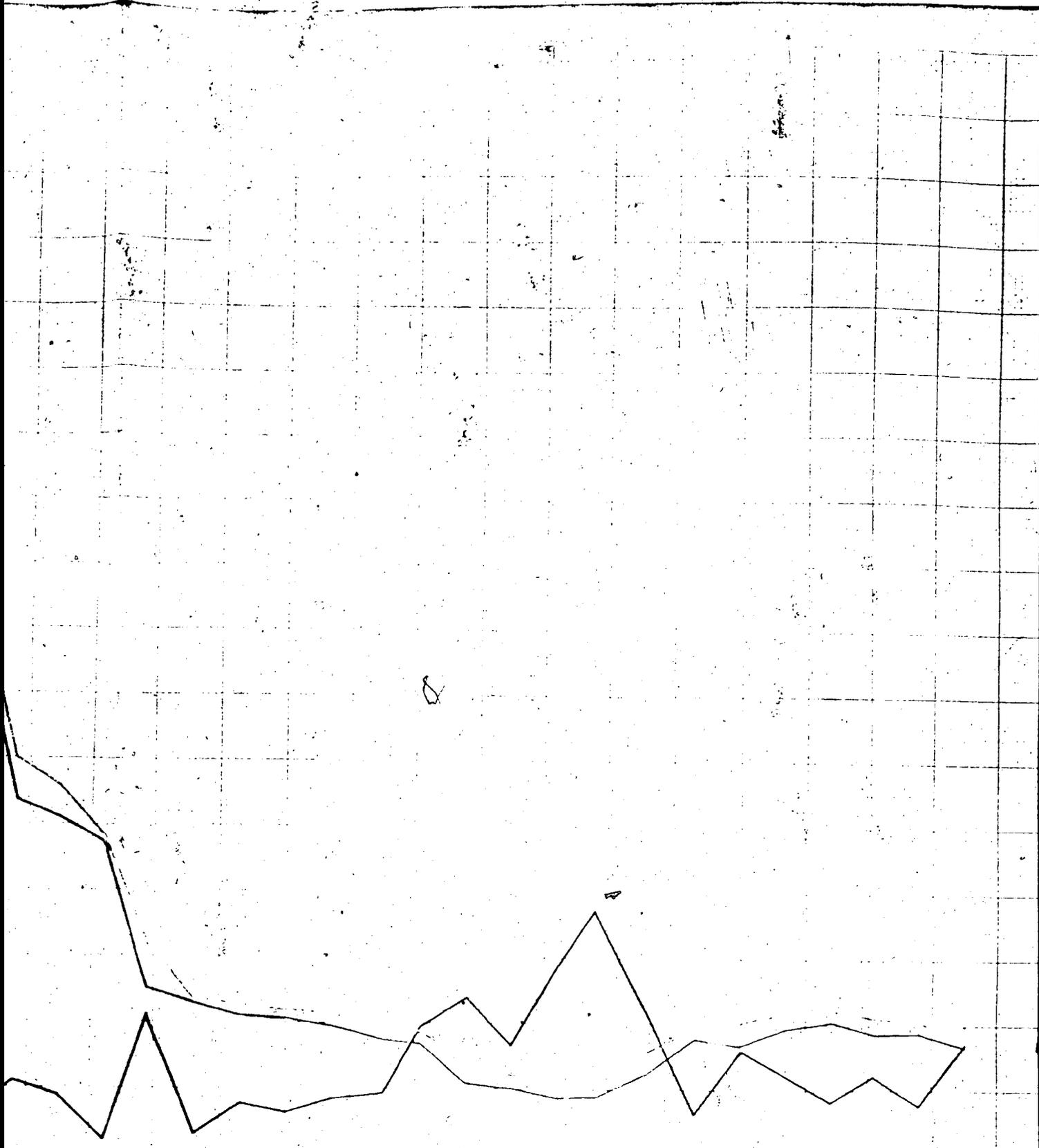
The maximum number of Carpenter foremen employed to directly supervise the work of the craftsmen was 25, which number was attained during the week ending August 14, 1943. The number of adjusted foremen man days actually worked numbered 7,780. The average ratio of foremen man days to carpenter man days worked





1943

EMPLOYMENT OF CARPENTER CRAFT
 CLINTON ENGINEER WORKS
 PROJECT-9733



OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY
1944

was approximately 1:10.5. These same foremen also supervised the work of the Carpenter Tenders. The average ratio of foremen man days to Carpenter and Carpenter Tenders working was approximately 1:12.3.

Cement Finishers were first employed on March 11, 1943 and the craft was maintained over 90% of the peak force of 60 reached on September 4, 1943, during the period from September 1, 1943 to September 9, 1943.

The number of Cement Finisher man days on roll prior to adjustment for days worked over eight hours was 5,037, which when adjusted, the on roll man days increased to 5,954. The adjusted eight hour man days actually worked were 5,424.

The average rate of absenteeism was practically 8.9%. A total of 529 eight hour man days were lost by this craft due to absenteeism.

The craft accounted for slightly over 2% of the du Pont manual forces constructing this project and for about 1.7% of the total manual forces of du Pont and the Cost-Plus-A-Fixed-Fee Subcontractors.

A force curve of the craft is shown on page 115.

The maximum number of foremen supervising the craftsmen was four, which was maintained during the period from June 15, 1943 until October 20, 1943. The adjusted foremen man days worked were 745. The ratio of foremen supervision to craftsmen working was approximately 1:7.3.

The Iron Workers - Reinforcing craft employment began on February 12, 1943. Peak force of 30 men was reached and maintained during the period from June 12, 1943 to June 26, 1943. The craft attained 90% of its peak on June 18, 1943 and maintained the force over this amount until July 17, 1943.

The number of Iron Workers - Reinforcing man days on roll was 5,477, which when adjusted to an eight hour day, was 4,115. The total man days worked was 3,526, based on an eight hour day.

Approximately 589 man days were lost by this craft due to absenteeism and the rate of absenteeism within the craft was 14.3%.

The craft accounted for 1.3% of the du Pont manual forces and approximately 1.1% of the total manual forces of du Pont and the Cost-Plus-A-Fixed-Fee Subcontractors.

A force curve of the craft appears on page 116.

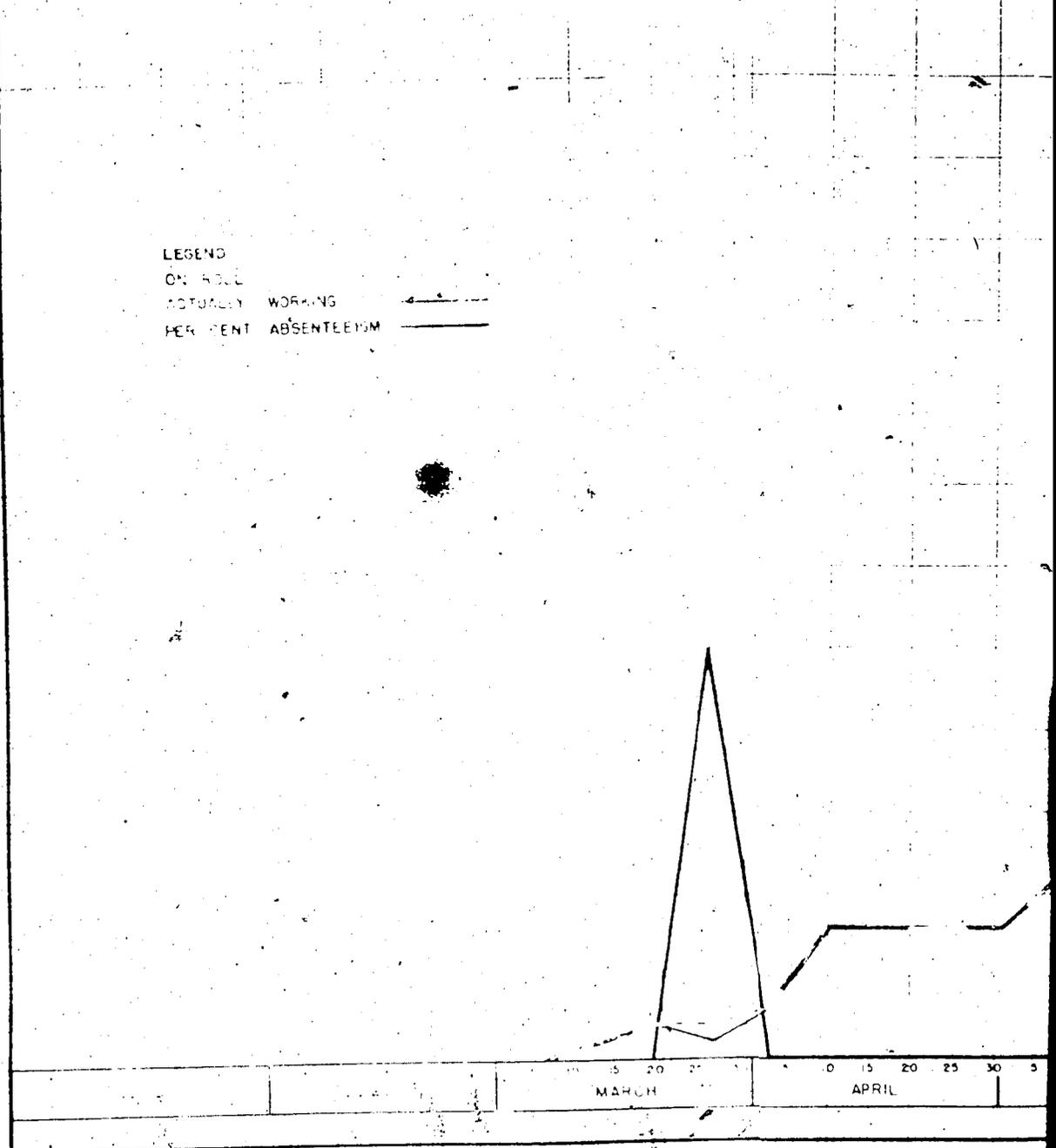
The maximum number of foremen supervising the craftsmen was four and this number was maintained from June 10, 1943 to October 20, 1943. The foremen man days worked were 780. The average ratio of foremen to craftsmen working was 1:4.5.

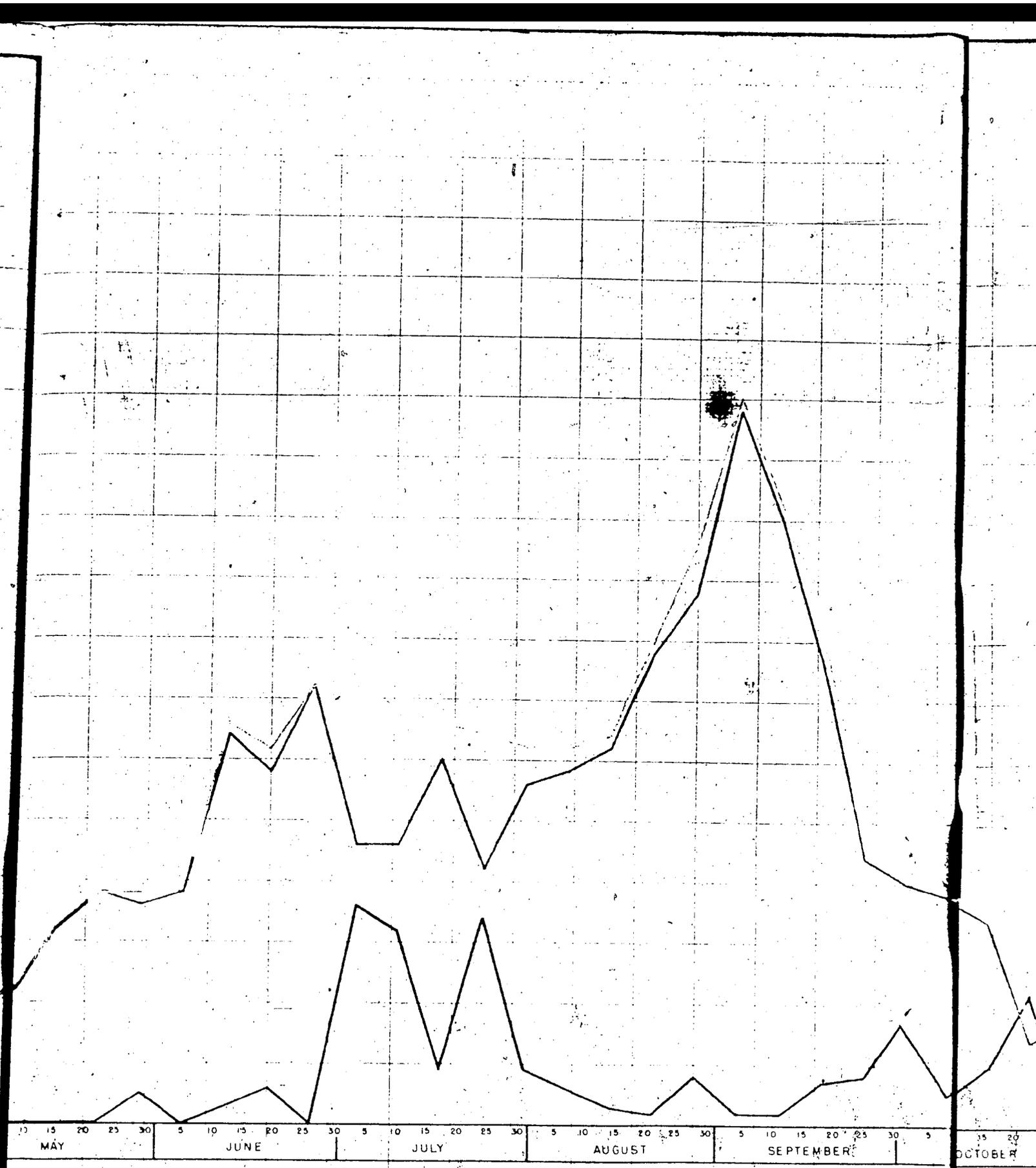
PER. CENT.

FORCE

60
55
50
45
40
35
30
25
20
15
10
5
0

LEGEND
ON FULL ACTUALLY WORKING
PER. CENT. ABSENTEEISM





1943

CEMENT FINISHERS
CLINTON ENGINEER WORKS
 PROJECTS 9733 & 58

PER CENT

FORM

50
45
40
35
30
25
20
15
10

LE EN
ACTUALLY MARKING
PER CENT INTER

	PER CENT	MARKING	INTER	
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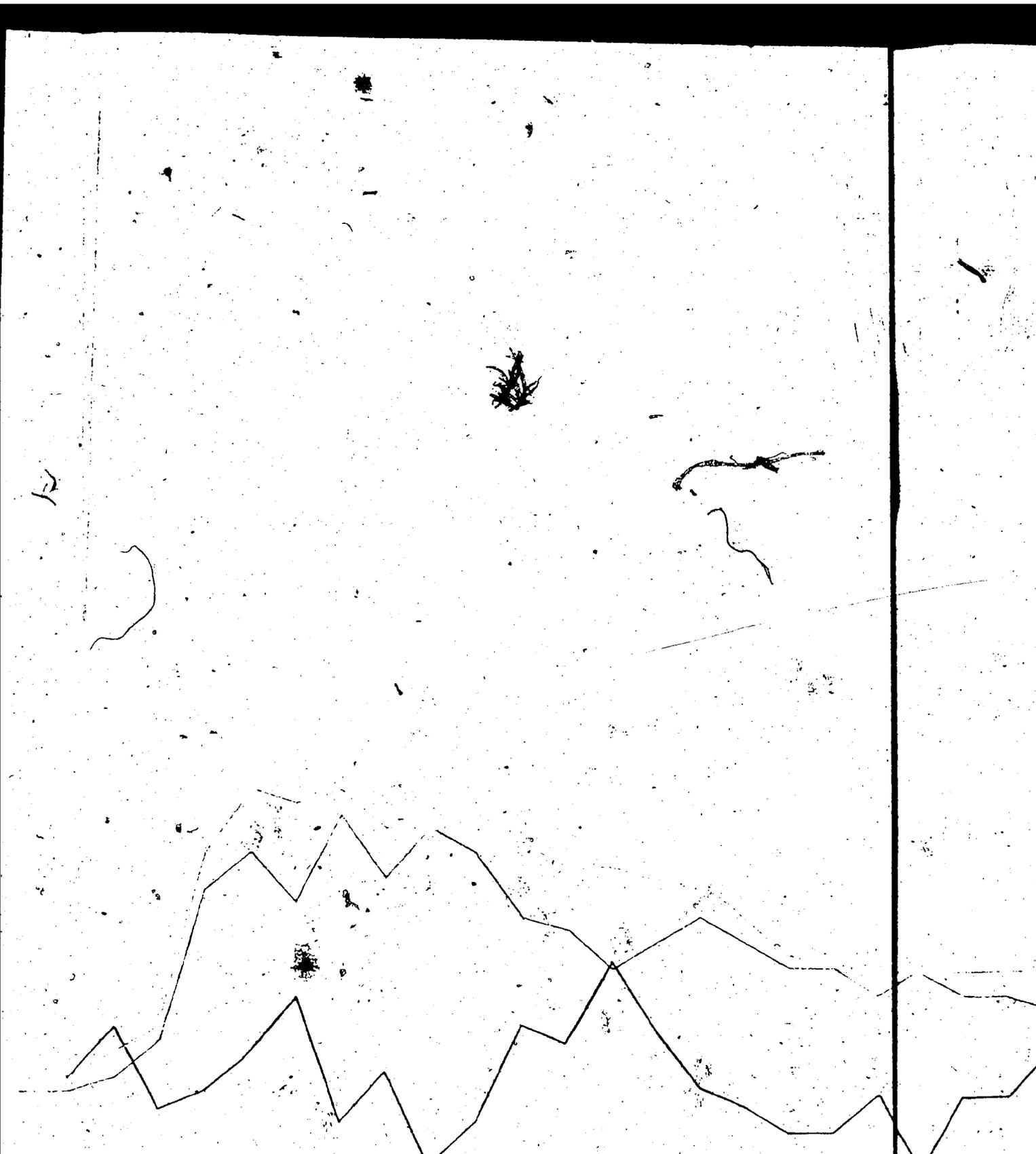


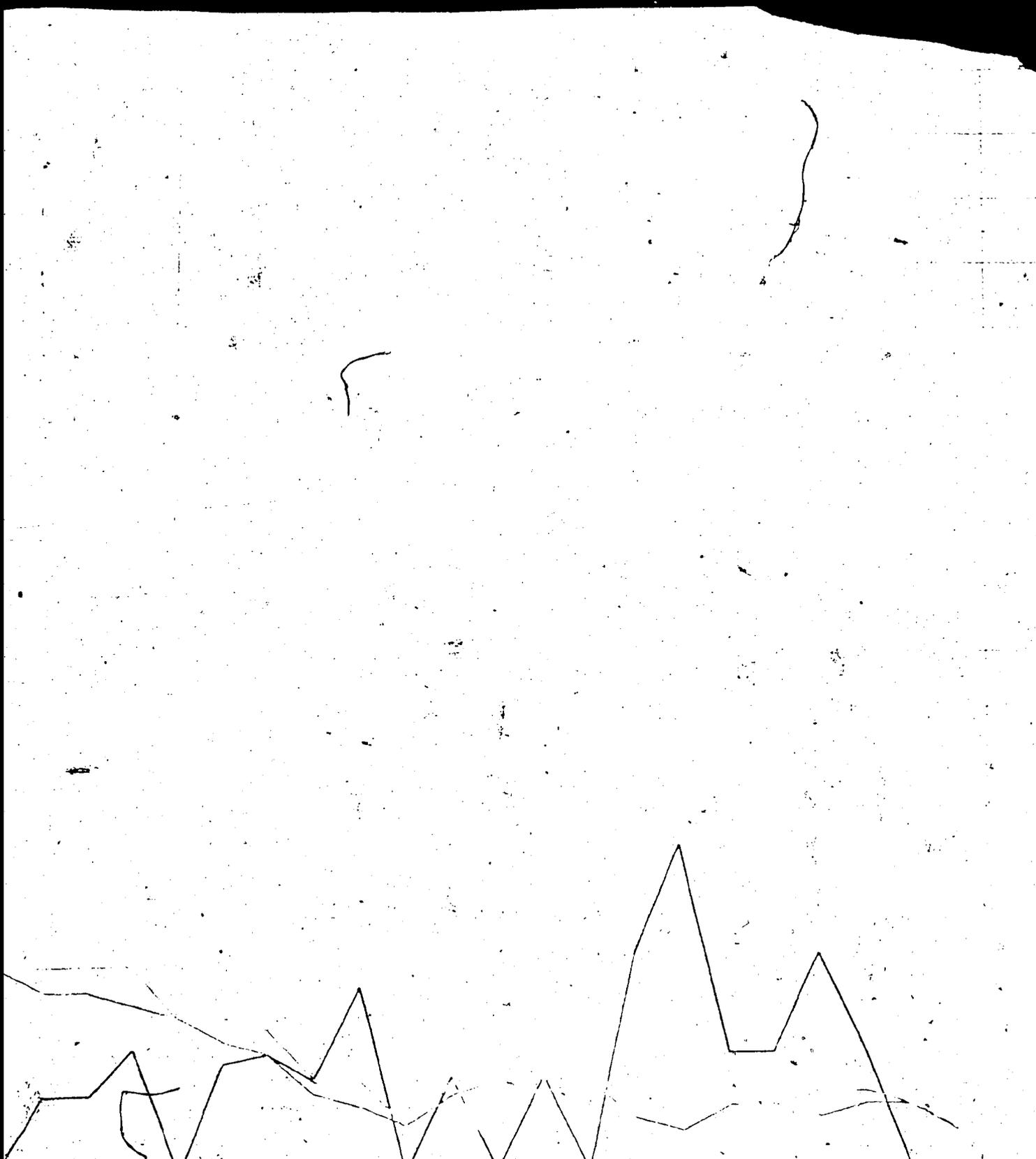
MAY 5 10 15 20 25 30 JUNE 5 10 15 20 25 30 JULY 5 10 15 20 25 30 AUGUST 5 10 15 20 25 30 SEPTEMBER 5 10 15 20 OCTOBER 5 10 15 20

1943

EMPLOYMENT OF IRONWORKERS - REINFORCING

CLINTON ENGINEER WORKS





1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
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944

The Iron Workers - Structural craft personnel was first employed on February 18, 1943. The craft consisted of Crane and Hoist Operators, Oilers and Iron Workers - Structural (Riggers). A force, over 90% of the maximum employment of 116 men reached on August 28, 1943, was maintained from August 19, 1943 through September 12, 1943.

The craft man days on roll were approximately 12,013 which when adjusted to an eight hour man day numbered 14,080 man days. The eight hour man days actually worked by this craft were 12,515.

The percent of absenteeism within the craft was 11.1% and 1,565 man days were lost by this craft due to absenteeism.

The craft accounted for 4.7% of the du Pont manual forces and 2.8% of the manual forces of du Pont and Cost-Plus-A-Fixed-Fee Subcontractors.

A force curve for the craft is on page 118.

The maximum number of foremen employed by this craft was 11. The adjusted foremen man days worked numbered 1,713. The average ratio of foremen supervising this craft to craftsmen working was approximately 1:7.1.

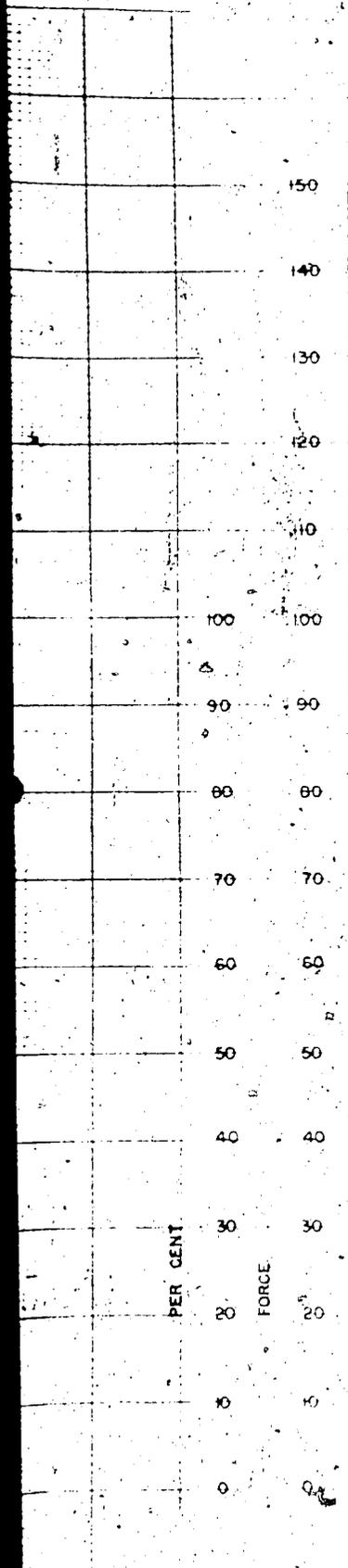
Labor craft employment was started during the first week construction began. The craft was divided into Common Labor and Rated Labor. Rated Labor consisted of Air Tool Operators, Carpenter Tenders, Concrete Laborers, Mortar Mixers and Pipe Layers. The total Labor craft personnel was maintained over 90% of the maximum force of 725 reached on August 21, 1943, during the period from August 3, 1943 to October 10, 1943. The over-all Labor force was relatively stable for the period beginning August 7, 1943 and ending October 9, 1943.

The total number of eight hour man days worked by Common and Rated Labor was 110,284 which was 41.1% of the du Pont manual force and 33.8% of the manual forces of du Pont and the Cost-Plus-A-Fixed-Fee Subcontractors required for the substantial completion of this project.

A force curve is shown on page 119 for Common and Rated Labor.

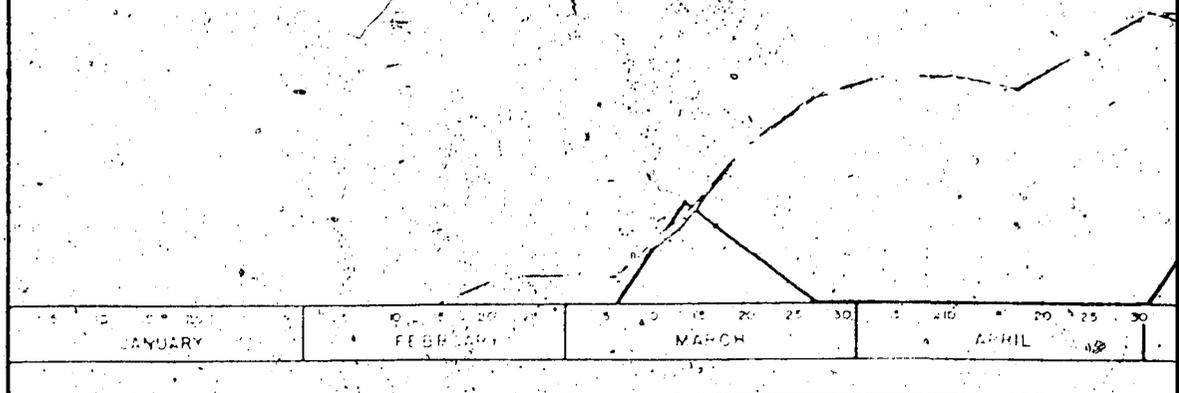
The maximum number of Labor foremen personnel was reached during the week ending August 14, 1943, when 45 foremen were on roll. The total foremen man days worked by both the Common and Rated Labor classifications was 9,016 eight hour man days. One division of Rated Labor; namely, the Carpenter Tenders were not under the direct supervision of the Labor foremen but were placed under the supervision of the Carpenter foremen. The total eight hour man days worked by the Carpenter Tenders was 14,052. The ratio of Labor foremen to craftsmen of both labor classifications in the labor craft, after eliminating the Carpenter Tenders was 1:10.7.

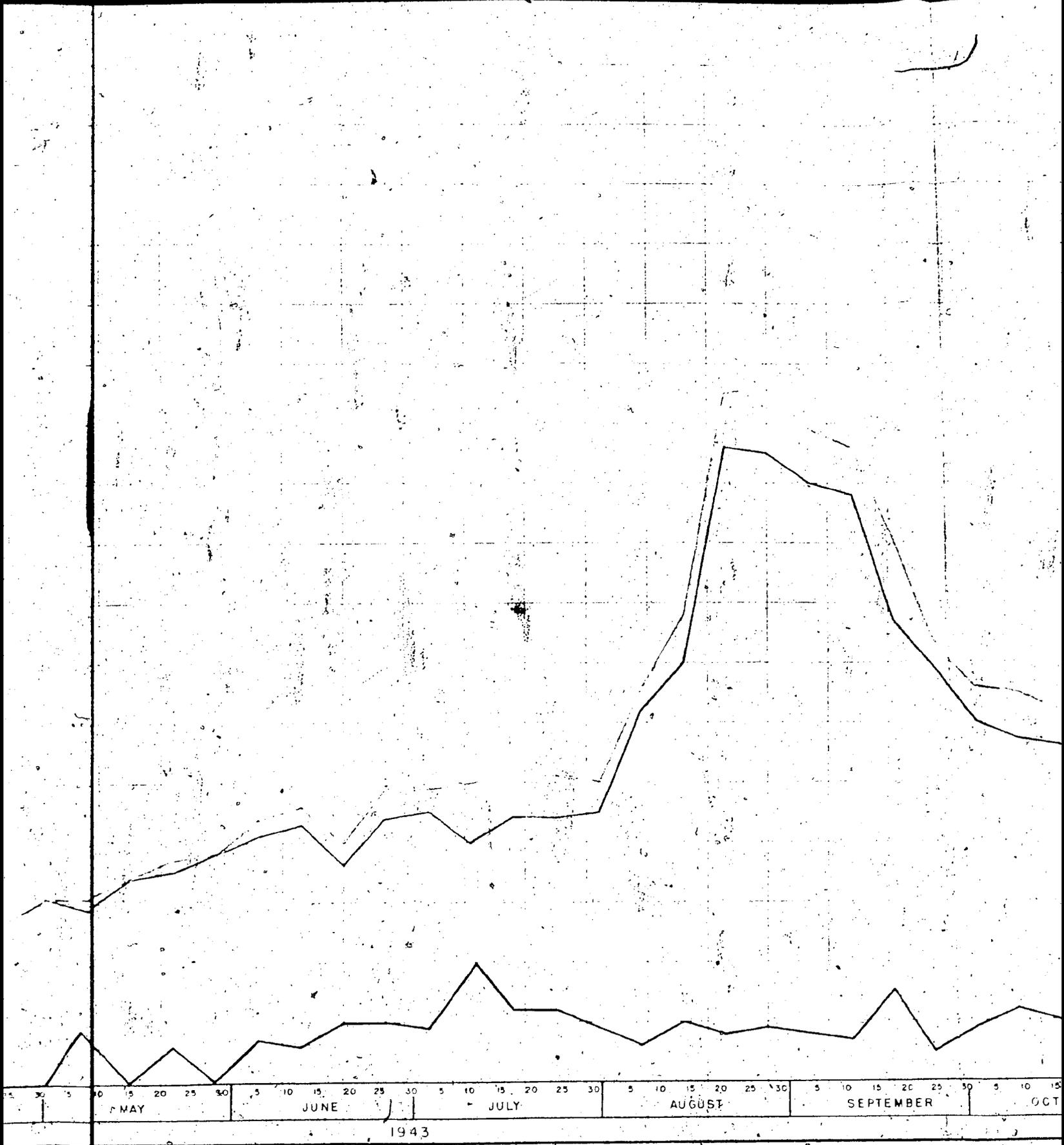
Common Laborers were first employed and a maximum force of



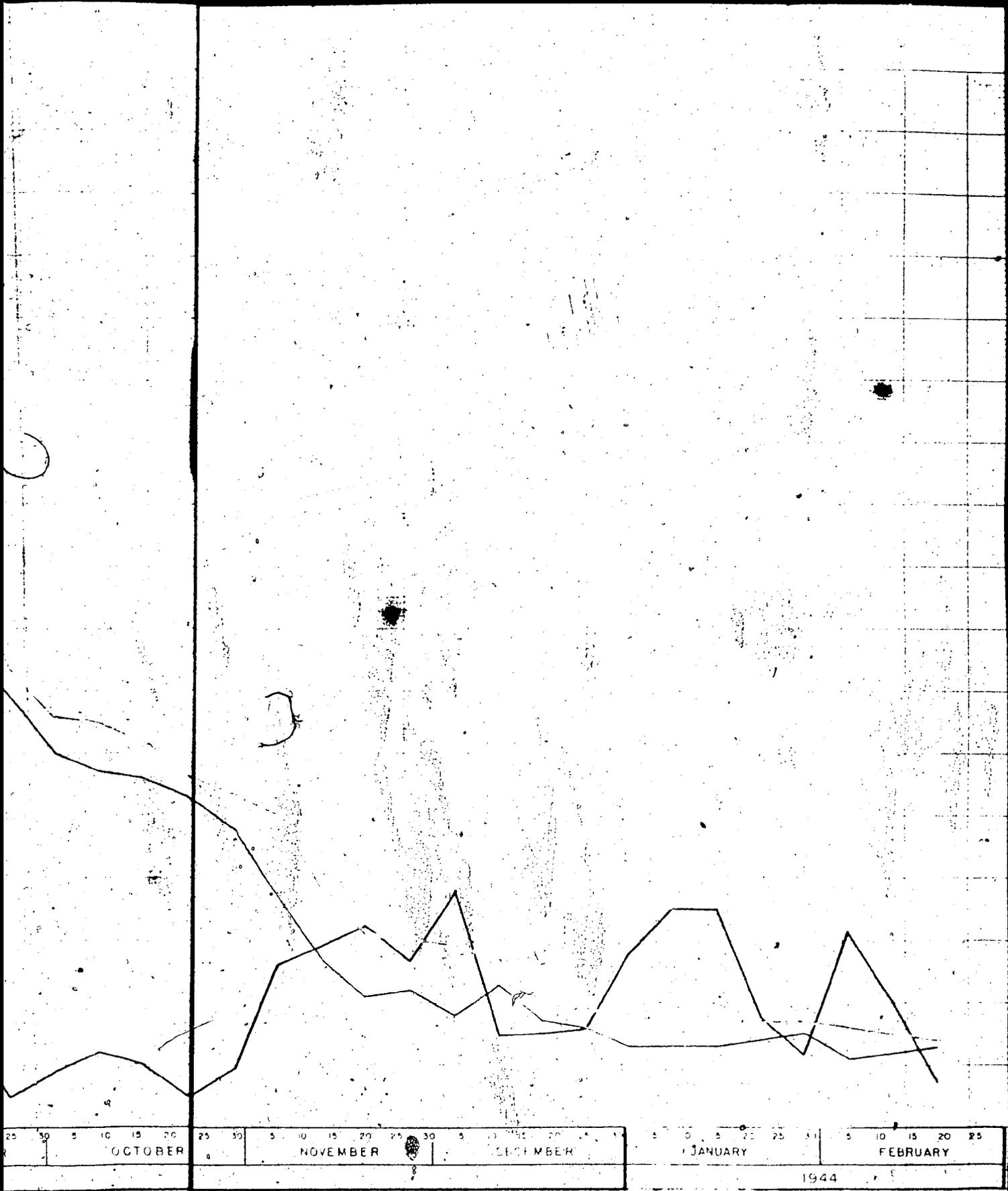
LEGEND
 ON ROLL _____
 ACTUALLY WORKING _____
 PER CENT ABSENTEEISM _____

NOTE:
 (IRONWORKERS STRUCTURAL (ROGERS) INCLUDES
 CRANE & HOIST OPERATORS & WELDERS)

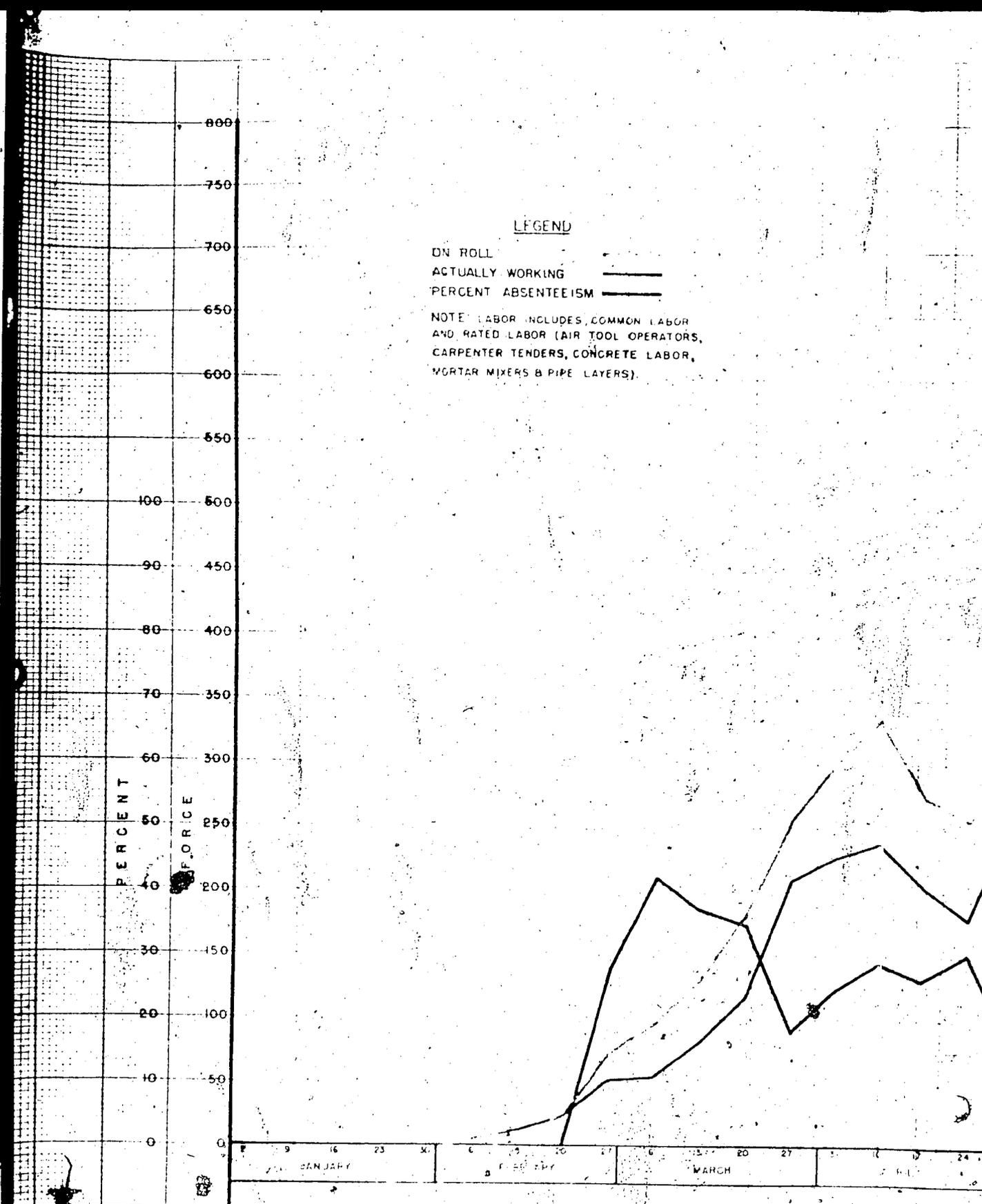


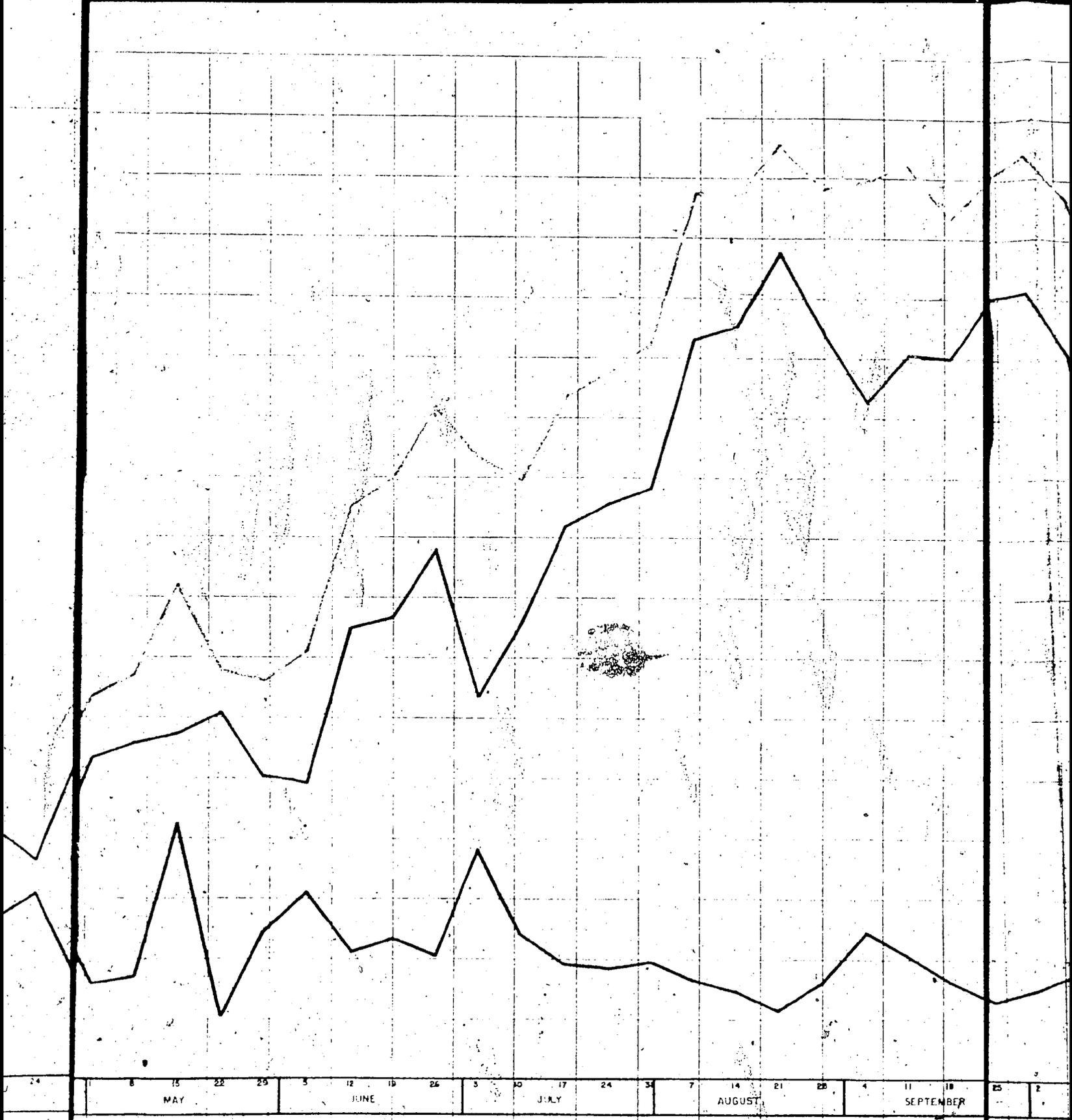


EMPLOYMENT OF IRONWORKERS — STRUCTURAL
 CLINTON ENGINEER WORKS



1944





1943

LABOR



1944

445 men was reached on August 7, 1943. During the period from August 3, 1943 to August 22, 1943 a force was maintained at over 90% of the maximum.

The accumulated man days of Common Labor on roll was 59,784 and this figure, when adjusted for an eight hour working day, increased to 71,725. The adjusted man days worked by this classification of Labor was approximately 56,268.

The rate of absenteeism in this craft classification was 21.6%. 15,457 man days of work were lost by the personnel in the Common Labor classification through December 11, 1943.

The Common Labor classification accounted for 21% of the du Pont manual force and 17.2% of the du Pont and Cost-Plus-A-Fixed-Fee Subcontractors forces.

A force curve of the employment of the Common Labor classification is shown on page 121.

Rated Labor was first employed on March 11, 1943 and a maximum force of 518 men was on roll on October 9, 1943. Employment of over 90% of the peak was maintained in the period from September 16, 1943 to October 19, 1943.

The approximate number of man days of Rated Labor on roll was 57,037, which when adjusted to an eight hour day, amounted to 68,682. This classification of Labor worked approximately 54,016 eight hour man days.

The percentage of absenteeism within the Rated Labor Classification was 21.4%. A total of 14,666 man days work were lost by this classification of Labor due to absenteeism.

Rated Labor furnished 20.1% of the man days worked by du Pont manual force and 16.5% of the man days worked by the manual forces of du Pont and Cost-Plus-A-Fixed-Fee Subcontractors.

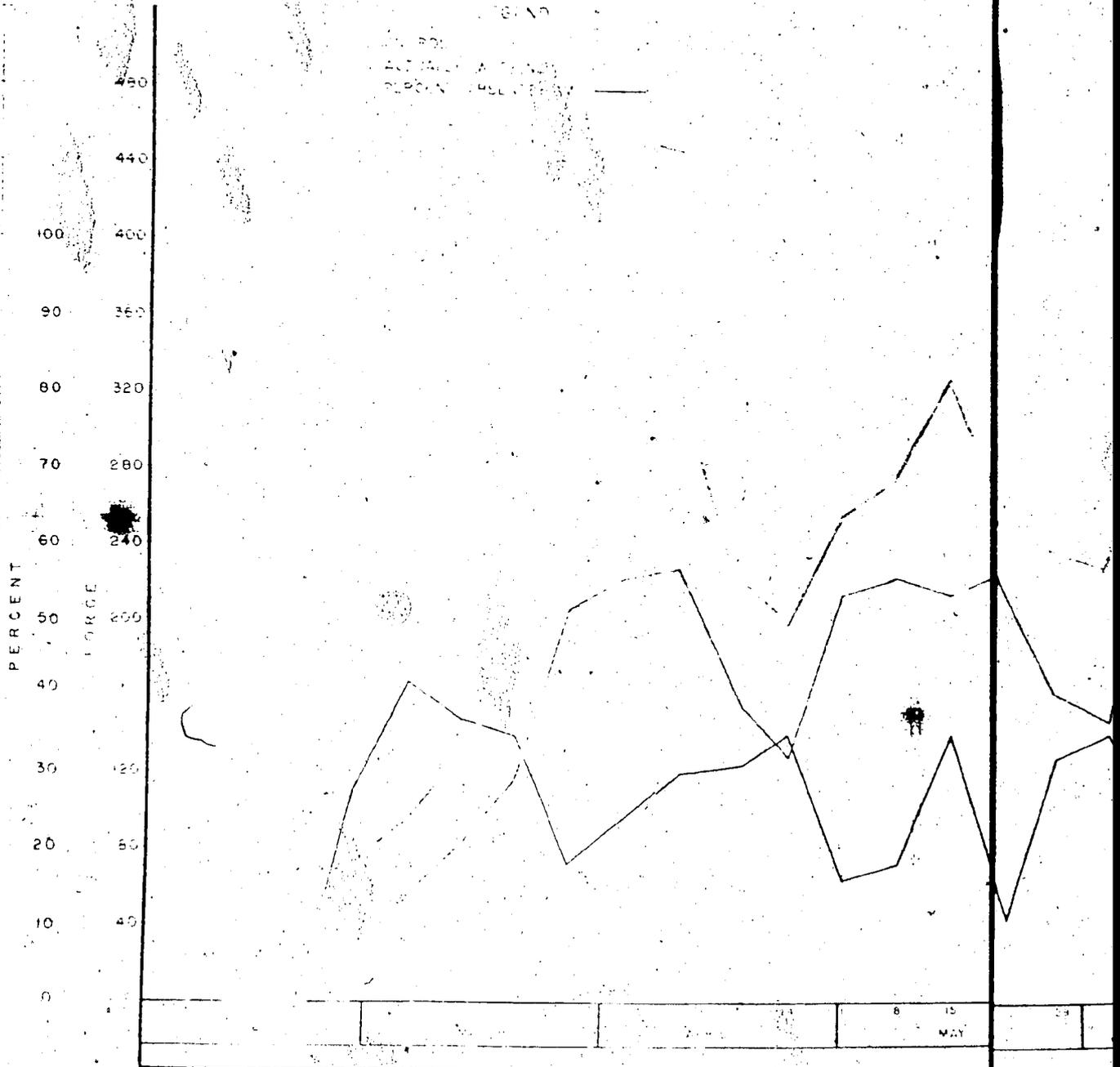
A force curve for Rated Labor is shown on page 122.

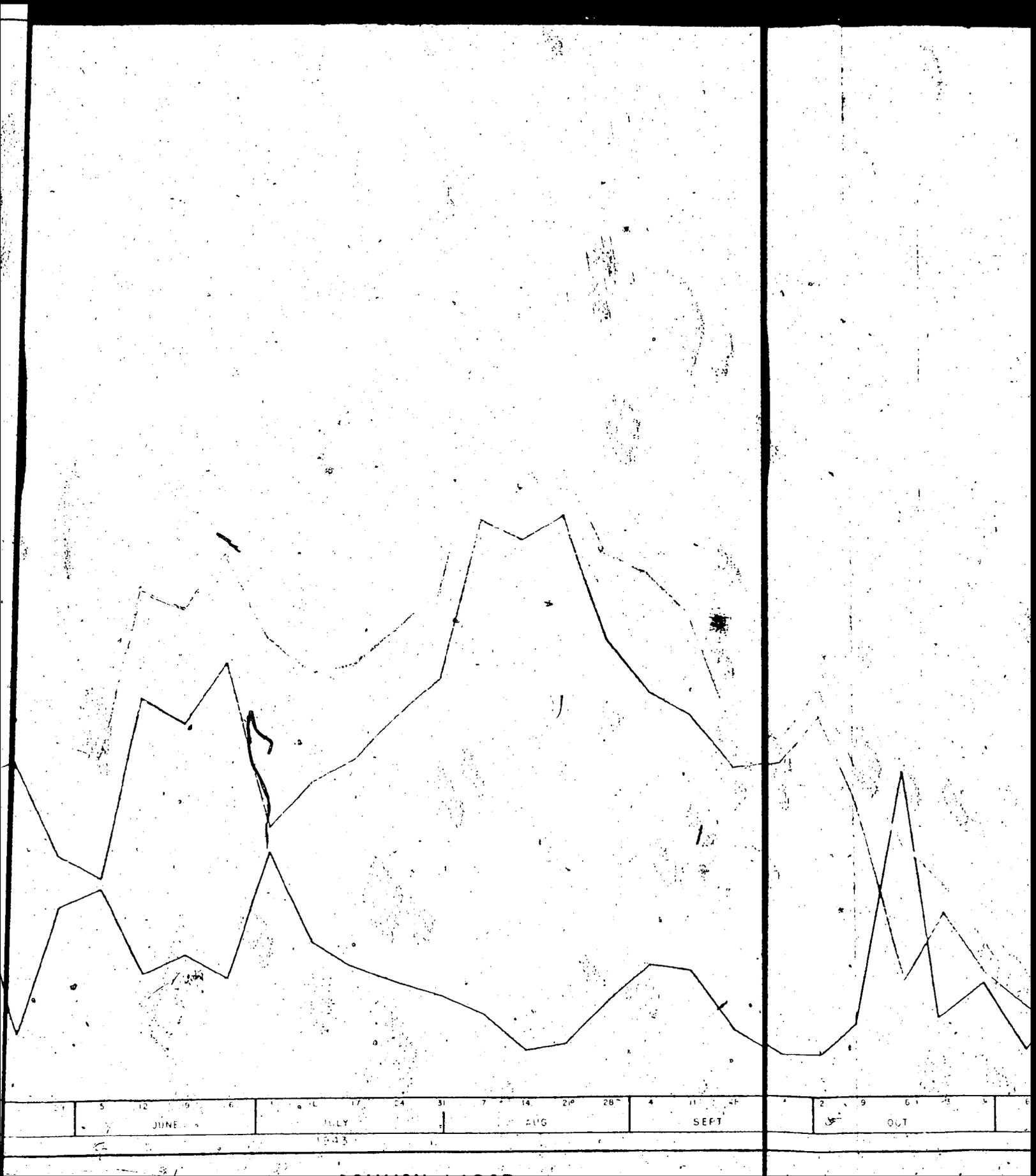
The first employees of the Millwright Department were placed on roll on March 25, 1943. The department personnel consisted of Blacksmiths, Blacksmith Helpers, Millwrights, Sheet Metal Workers and Welders. Maximum force of 106 men was reached during the week ending October 2, 1943. A force was maintained over 90% of the peak force from September 24, 1943 to October 10, 1943.

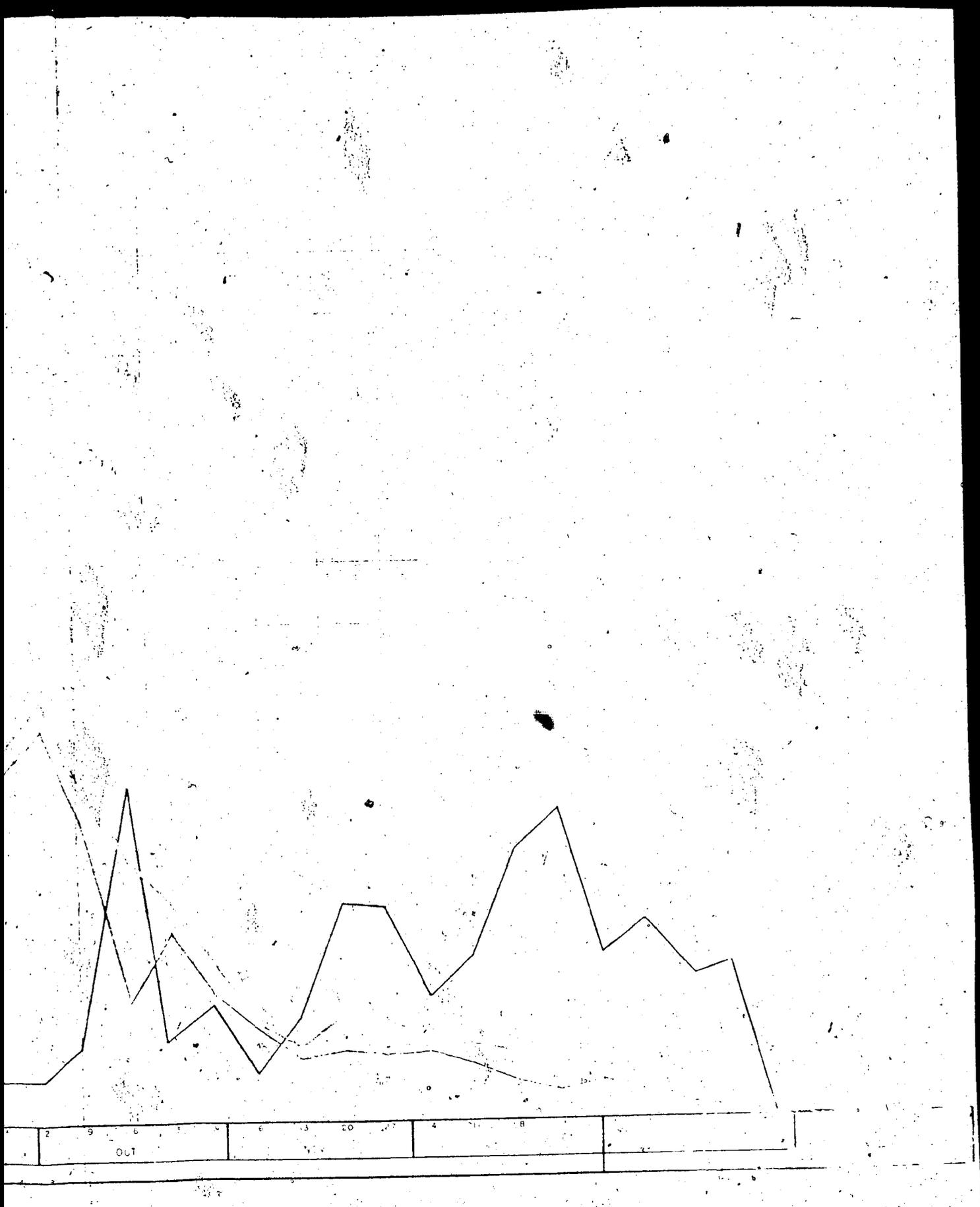
The number of man days on roll was 21,022, which when adjusted to an eight hour day amounted to 24,906. 23,021 eight hour man days were worked by this department.

The absenteeism rate was 7.7% and 1,887 man days were lost by this department due to this cause.

This department accounted for 8.6% of the du Pont manual







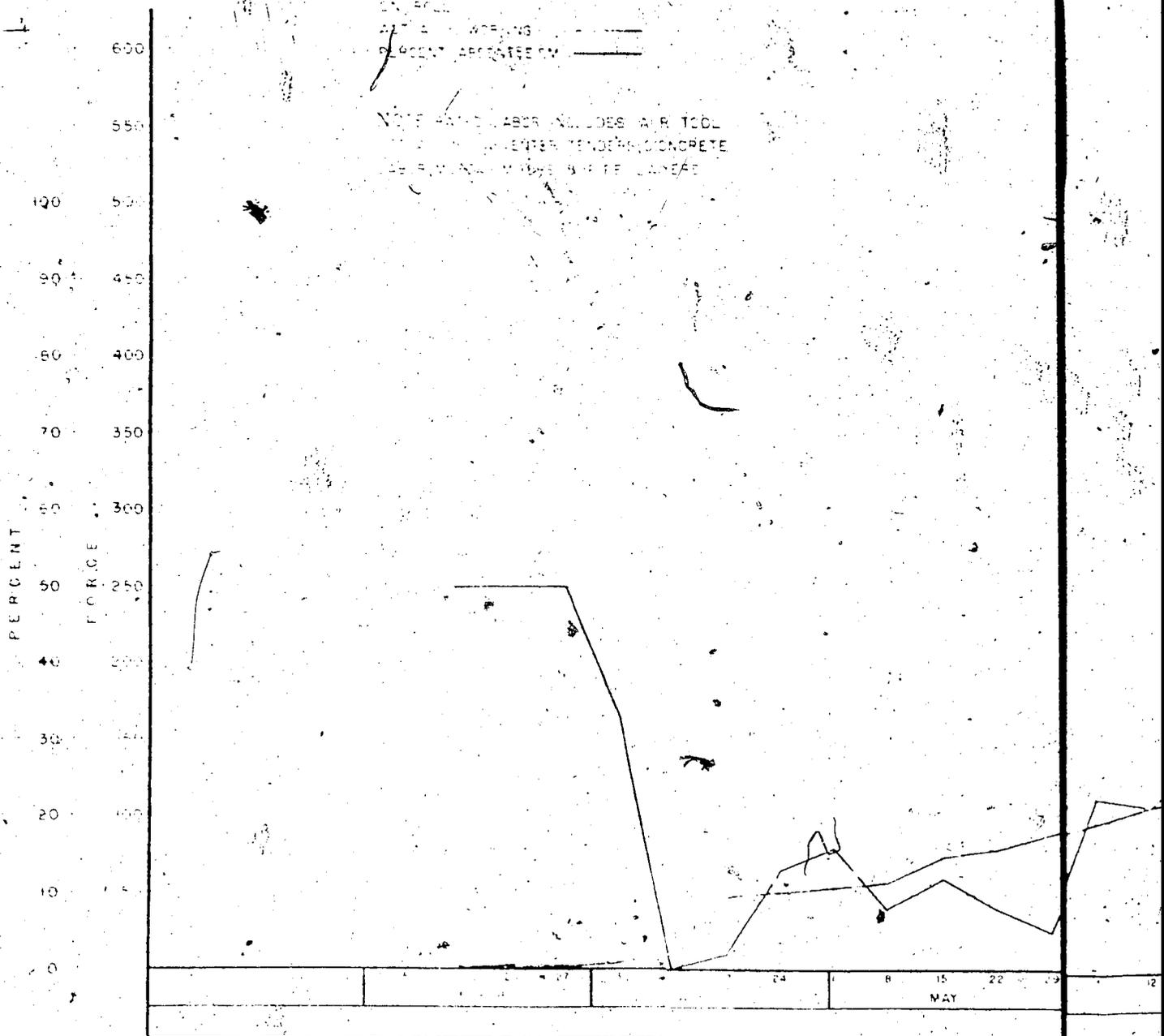
LEGEND

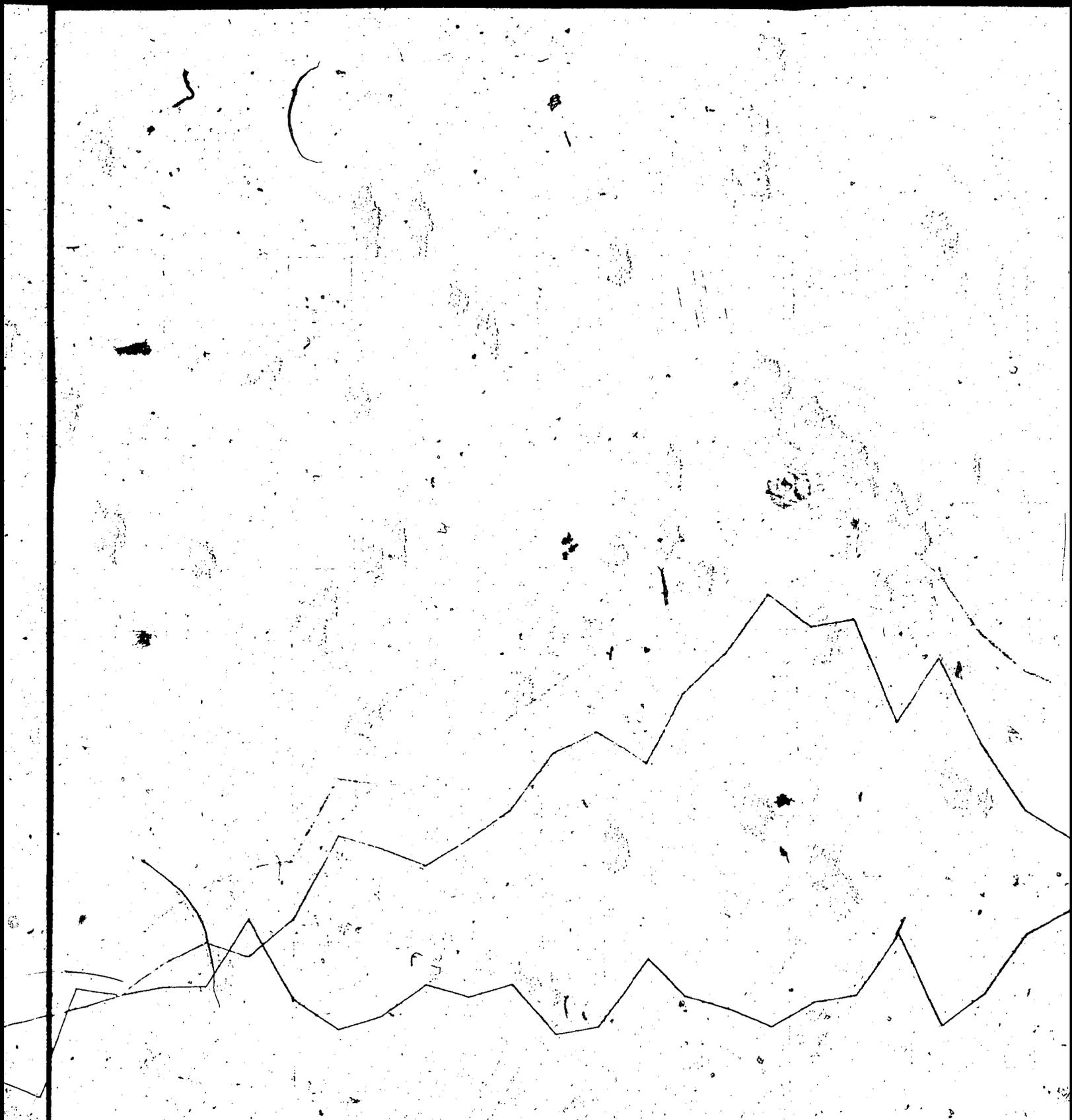
CONCRETE

AIR TOOL WORKING

PERCENT AIR TOOLS ON

NOTE: LABOR INCLUDES AIR TOOL
OPERATOR AND CENTER TENDERS, CONCRETE
PUMP OPERATOR AND ONE WIRE LINE FEEDER



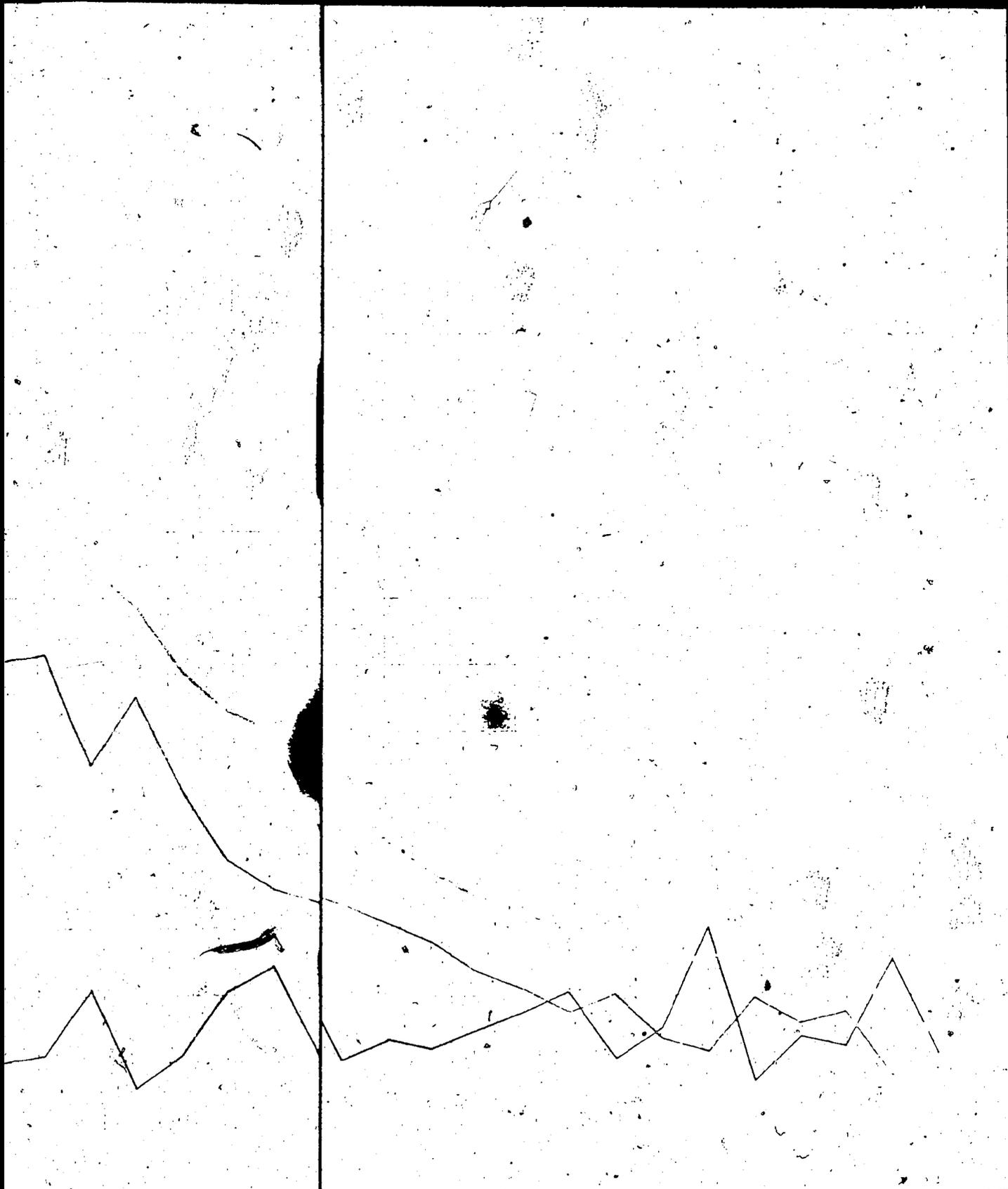


12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16	23	30	6
JUNE			JULY				AUG			SEPT			OCT								

1943

RATED LABOR

CLINTON ENGINEER WORKS



9	16	23	30	6	13	20	27	4	11	18	25
OCT.				NOV.				DEC.			

force and 7% of the manual forces of the Company and the Cost-Plus-A-Fixed-Fee Subcontractors.

A force curve for the department appears on page 124.

The maximum number of foremen in the Millwright Department was 34. Peak foremen personnel was reached and maintained during the weeks ending September 18, 1943 and September 26, 1943. The adjusted foremen man days worked were 4,378. The average ratio of foremen to craftsmen was 1:5.3.

The paint craft was among those first employed on the project. The maximum number of painters was 47, which number was placed on roll during the week ending August 14, 1943. A force greater than 90% of the peak was maintained from August 10, 1943 to September 4, 1943.

The approximate number of craftsmen man days on roll was 4,469, which when adjusted for eight hour days numbered 5,278. The eight hour man days worked were 4,724.

The percentage of absenteeism within the craft was 10.5%. A total of 554 man days were lost in this craft due to absenteeism.

This craft provided 1.8% of the manual du Pont employment and 1.4% of the manual du Pont and Cost-Plus-A-Fixed-Fee Subcontractors forces.

The force curve of the craft is shown on page 125.

The maximum number of foremen employed by the craft was 4, which number was maintained on roll from about August 12, 1943 to October 10, 1943. The number of foremen man days worked was 499. The average ratio of foremen to craftsmen was 1:9.5.

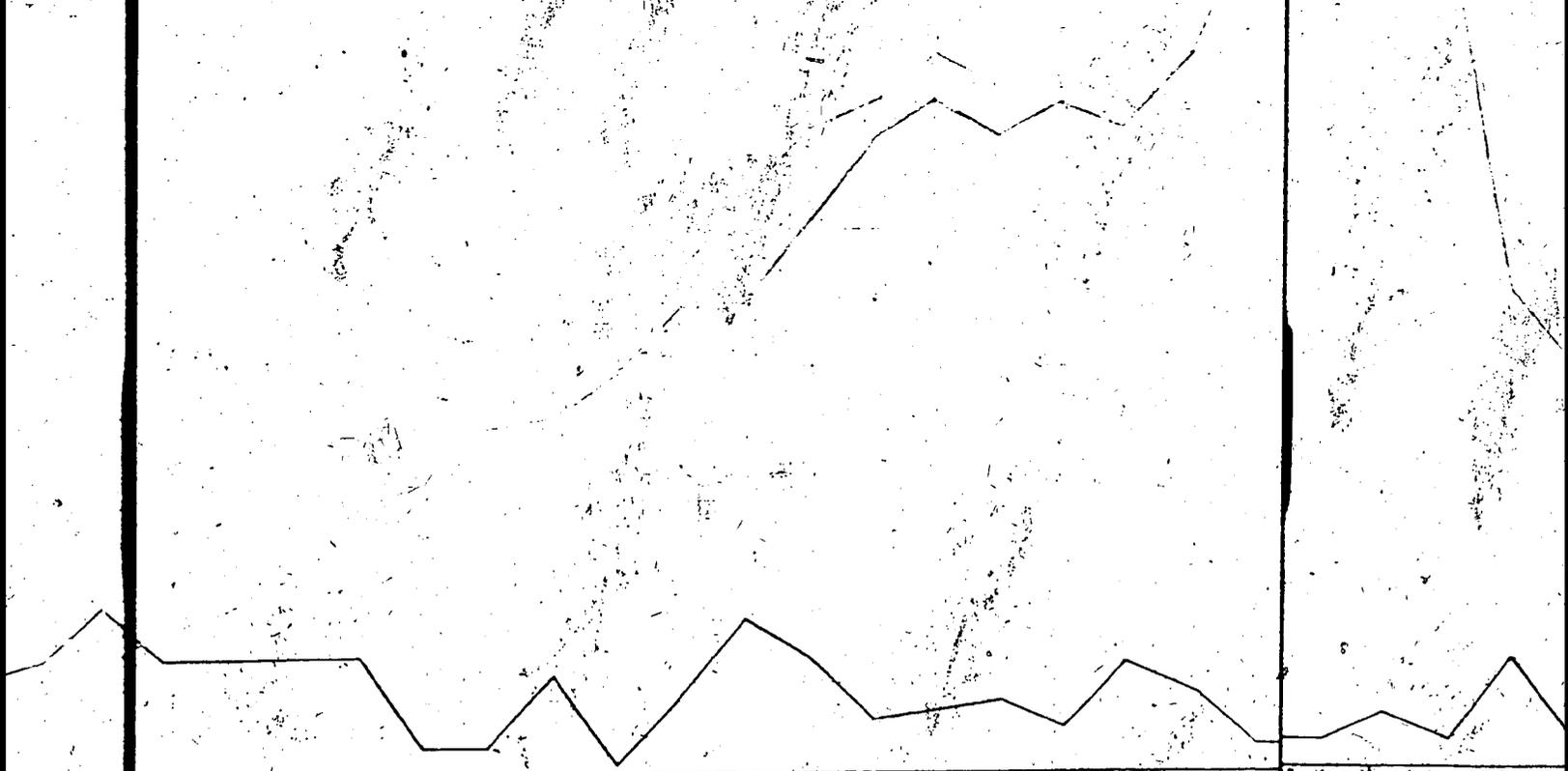
Employees of the Transportation Department appeared upon the project during the first week of employment. The peak force of 175 men in the department was reached on August 28, 1943. The Transportation Department personnel consisted of Gas and Diesel Mechanics and Helpers, Power Equipment Operators, except Crane and Hoist Operators, Truck Drivers and Oilers. The force was maintained over 90% of the maximum from August 7, 1943 to September 23, 1943.

The man days on roll of this department was 2,628, which when adjusted for an eight hour working day amounted to 31,061 man days. The department worked 27,279 eight hour man days while 3,802 man days were lost by the employees representing 12.1% absenteeism.

The department was responsible for 10.2% of the total man days worked by the du Pont manual force and 8.4% of the manual force of du Pont and of the Cost-Plus-A-Fixed-Fee Subcontractors.

A force curve of the Transportation Department is shown on page 126.

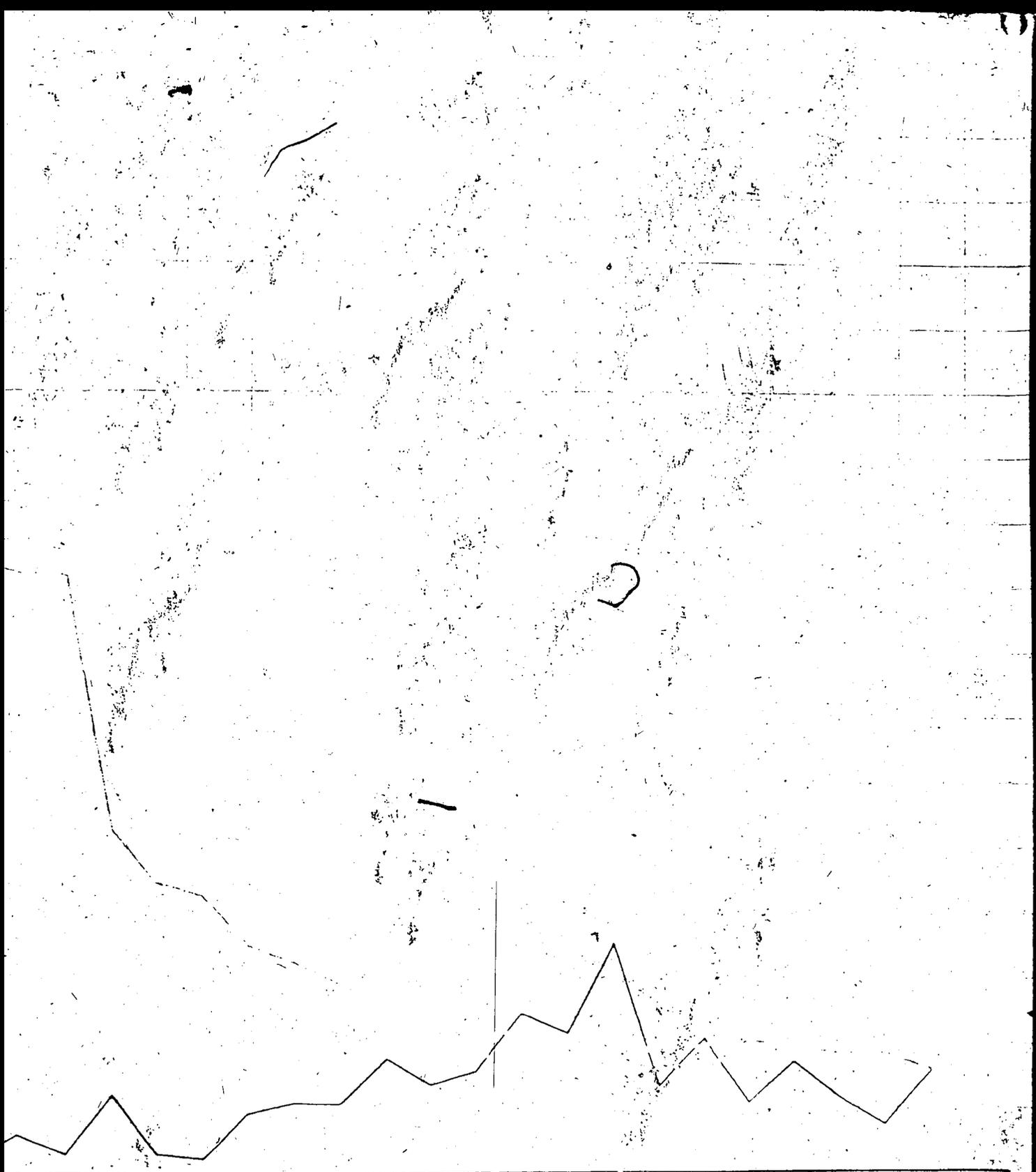
THE NEW YORK



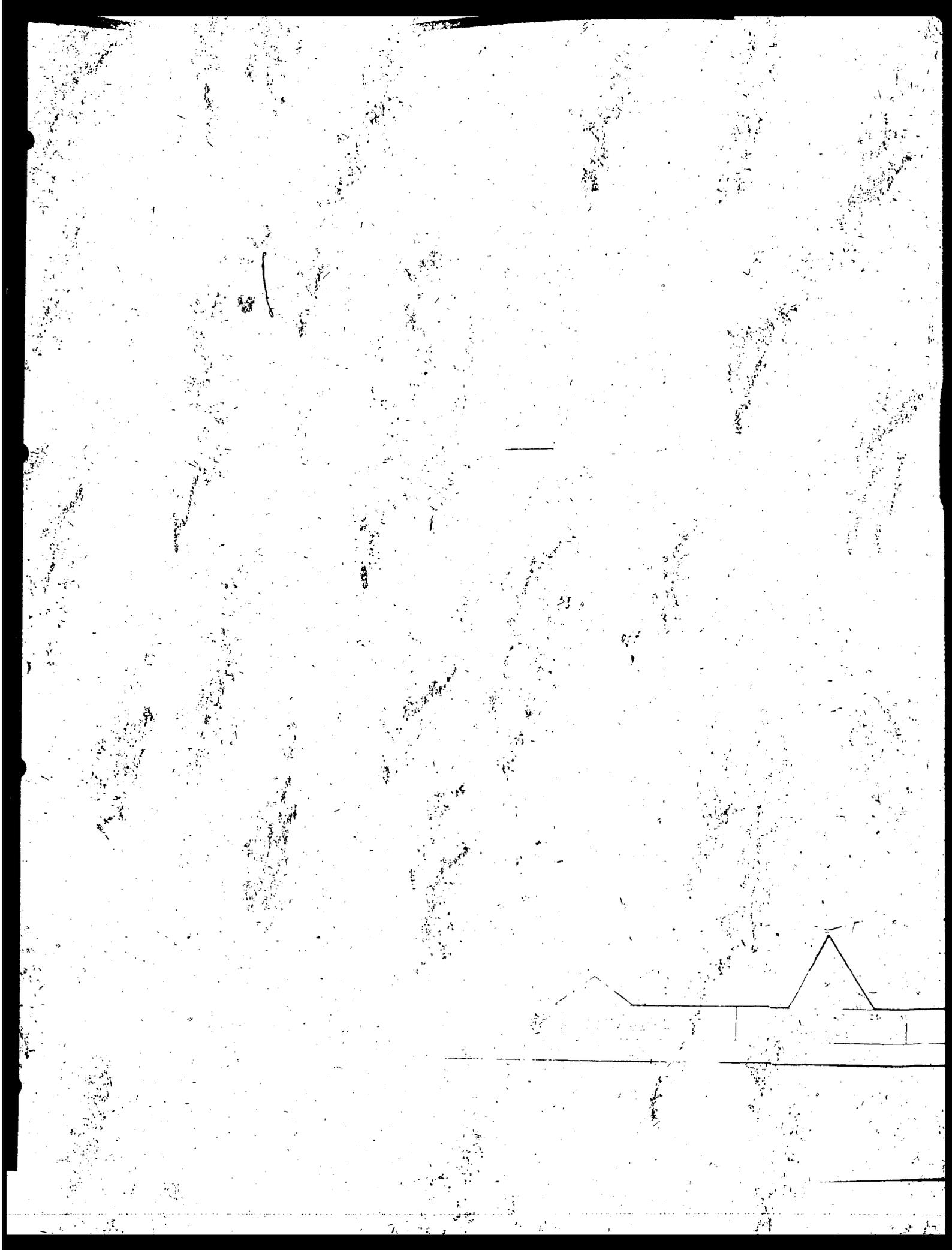
EMPLOYMENT OF MILLWRIGHT CRAFT

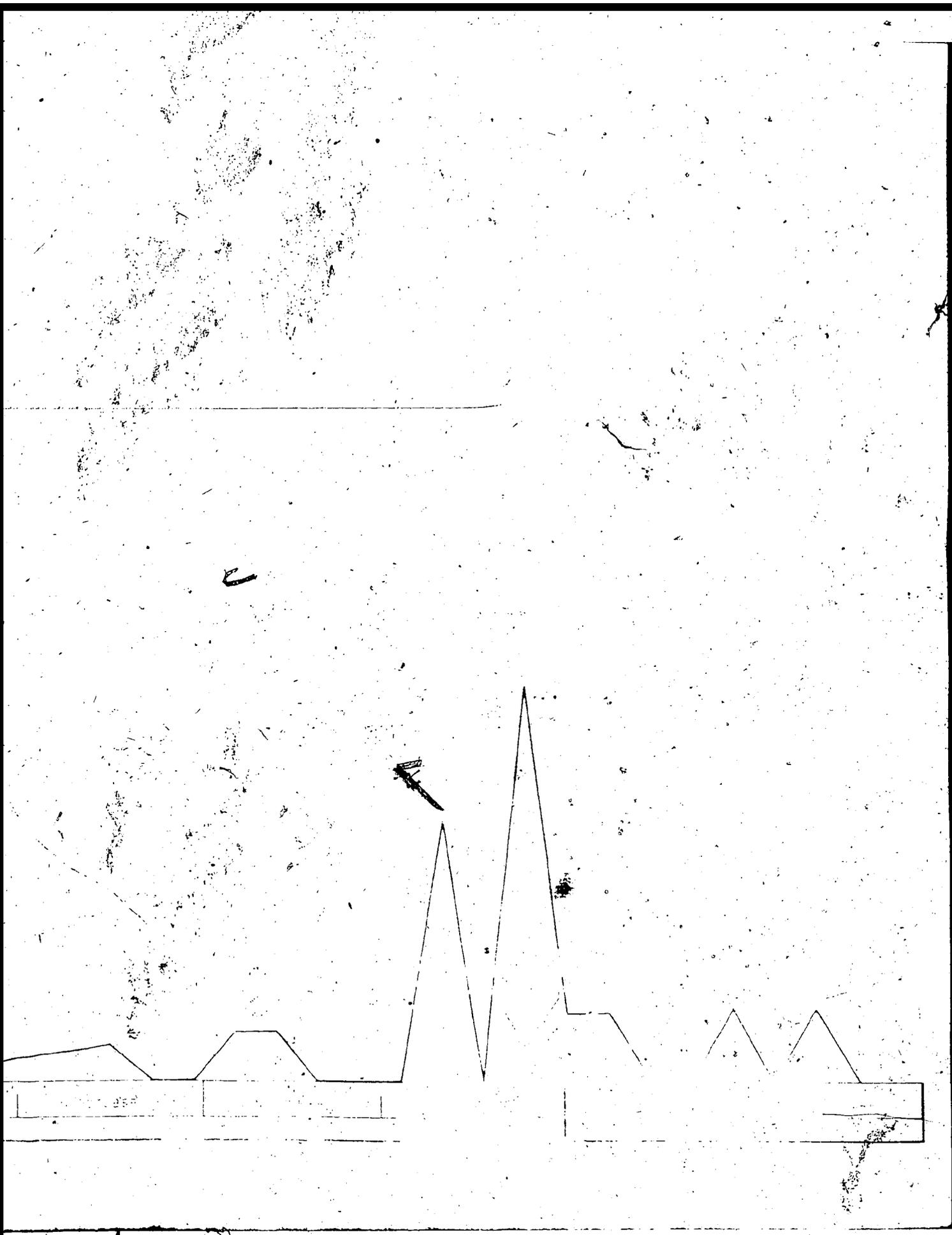
CLINTON ENGINEER WORKS

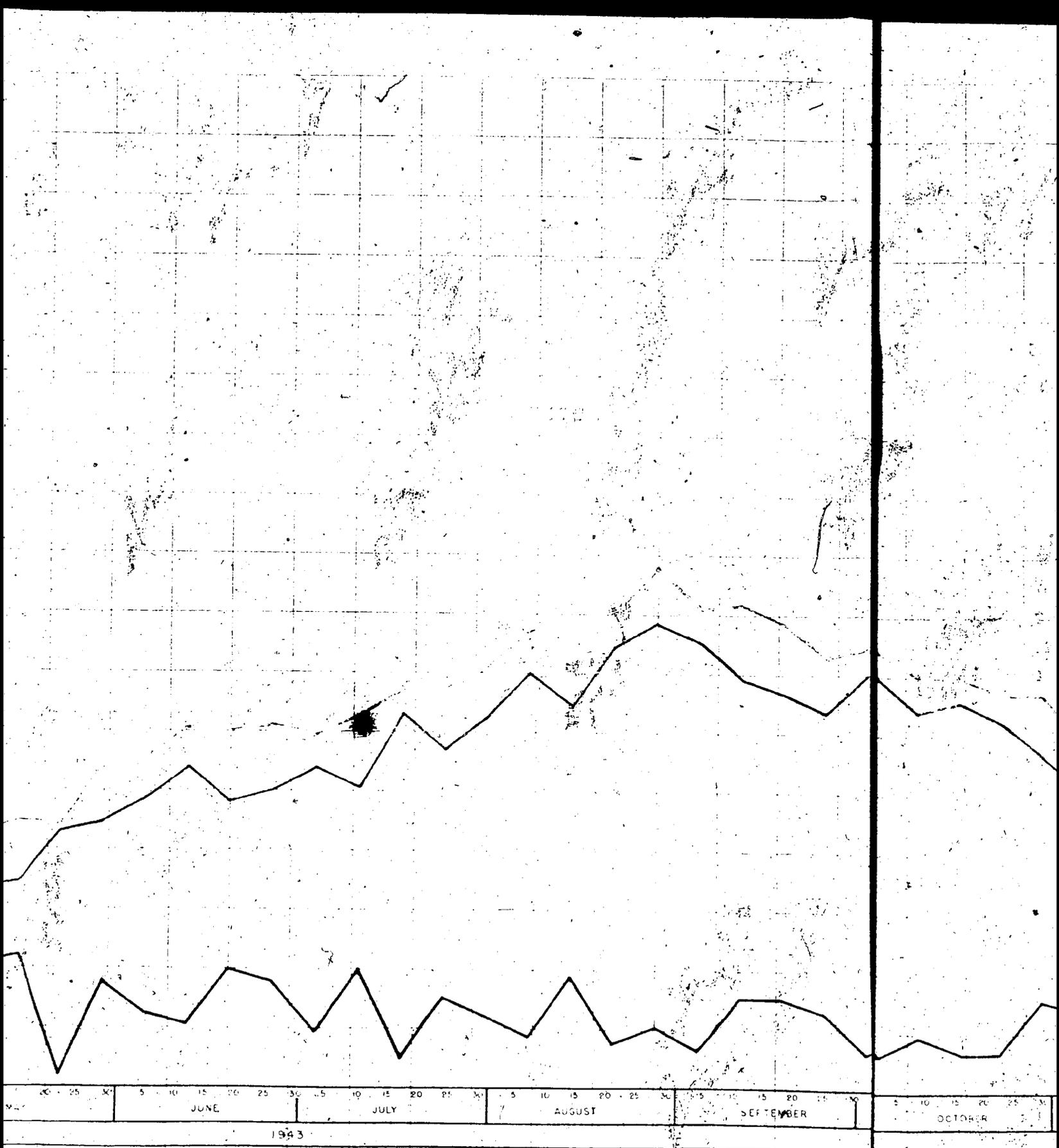
PROJECT 9733 & 58



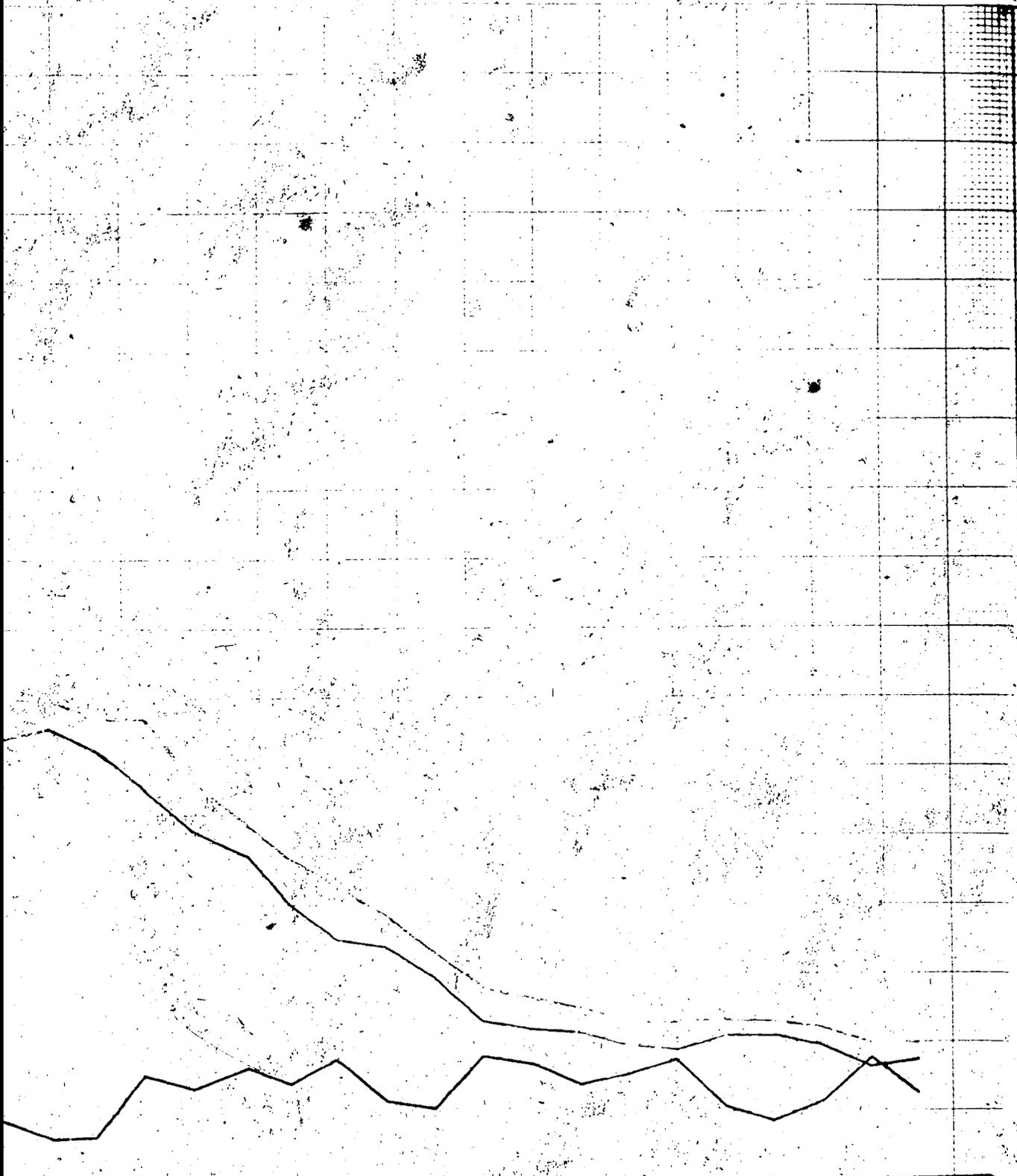
OCTOBER	NOVEMBER	DECEMBER		







EMPLOYMENT OF TRANSPORTATION
CLINTON ENGINEER WORKS



10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
												244			

The maximum number of Transportation foremen was 11 and this number was maintained on roll during the period from August 3, 1943 to August 20, 1943. The number of foreman man days worked was 1,989. The average ratio of foreman man days to craft man days worked was 1:13.7.

The total accumulated man days on roll of all the du Pont manual employees through December 11, 1943 amounted to 266,498, which number when adjusted for an eight hour working day, was increased to a total of 315,879 on roll man days. The manual personnel worked 268,134 eight hour man days. A total of 47,745 man days were lost on this project due to absenteeism by the manual forces of the Company. The average rate of absenteeism of these forces was 13.1%. The du Pont manual forces accounted for 82% of the total manual forces of du Pont and the Cost-plus-a-Fixed-Fee subcontractors.

(2) Cost-Plus-A-Fixed-Fee Subcontractors

The manual force of the Broadway Maintenance Corporation consisted of Electrician Journeymen and Apprentices of various degrees of service.

The first Electricians were employed on March 5, 1943 and the craft reached 90% of its peak force on April 11, 1943. The maximum number on roll was 252 and was reached on September 23, 1943. The on roll man days worked by this craft through December 11, 1943, were 23,139, which when adjusted to an eight hour day numbered 27,874 eight hour man days. 25,536 eight hour man days were required by this craft in the substantial completion of the project prior to the start of construction on authorized additions on December 11, 1943.

The rate of absenteeism of the manual employees of the Broadway Maintenance Corporation was 6.7%, which was equal to 1,838 man days of lost time. The Electrical Craftsmen accounted for 7.8% of the total manual forces of the Cost-Plus-A-Fixed-Fee Subcontractors and of the du Pont Company.

A curve of the manual forces appears on page 110.

A maximum force of 25 Electrician foremen was reached on September 18, 1943. The number of eight hour man days worked by the foremen of this craft was 2,614 and the average ratio of foremen to craftsmen was 1:9.8.

The manual force of the B. F. Shaw Company consisted of steamfitters, steamfitter welders, and plumbers. Employment began on March 29, 1943, and a maximum manual force of 275 men was reached on September 4, 1943. The force was maintained at over 90% of the peak during the period from August 16, 1943 to September 23, 1943. The man days on roll numbered 29,446, which when adjusted to an eight hour day amounted to 35,057 man days. The equivalent eight hour man days worked by these craftsmen were 33,075.

1,982 man days were lost by the manual employees of the B. F. Shaw Company due to absenteeism, which was equal to a rate of 5.7%. The craftsmen of this Company accounted for 10.1% of the total manual forces of the Cost-Plus-A-Fixed-Fee Subcontractors and of du Pont Company. A force curve of the craft is shown on page 111.

The maximum number of foremen on the roll was 24, which number was reached on October 9, 1943. The eight hour foremen man days worked were 3,543. The average ratio of foremen to craftsmen was 1:9.3.

(d) Lump Sum Subcontractors

The on roll man days of Lump Sum Subcontractors numbered approximately 23,022. The equivalent eight hour man days worked was 24,061. A tabulation of the equivalent eight hour man days worked through December 11, 1943, by each of the subcontractors follows:

SubcontractorEquivalent eight-hour man days

A. J. Metler	4013
Albert Bros. Contractors, Inc.	8154
Armstrong Cork Company	1364
Cement Gun Company	3367
Chattanooga Boiler & Tank Company	21
Chicago Bridge & Iron Company	221
Combustion Engineering Company	3
Emory Construction Company	1129
General Electric X-ray Corporation	4
Grinnell Company, Inc.	214
Haughton Elevator Company	118
J. D. Helton Roofing Company	799
Johnson & Willard	1240
Layne-Central Company	62
Link-Belt Company	117
McCabe Construction Company	803
O'Neill Exterminating Company	1
Rust Engineering Company	1022
Warner Elevator Mfg. Company	101
J. E. Winans	1204
Young and Bertke	104

(c) Recap

The total number of man days on roll of the non-manual du Pont force was 93,704. Because current records were not kept on absenteeism for a large portion of the personnel in this group, but as a number of the employees of this group worked hours greater than the normal eight hour day, it can be safely assumed that the equivalent eight hour man days actually worked by the non-manual du Pont force was the same as the adjusted on roll man days; namely, 93,704. The average percent du Pont non-manual from the start of the project to December 11, 1943, based on the on roll man days, was 26.

The on roll man days of the non-manual force of the Broadway Maintenance Corporation were 2,975, which, when adjusted to eight hour man days actually worked by the employees, numbered 3,369.

The on roll man days of the non-manual force of the B. F. Shaw Company were 5,931, which was equivalent to 6,948 eight hour man days. The force actually worked 6,856 eight hour man days.

The on roll man days of the non-manual forces of the Cost-Plus-A-Fixed-Fee Subcontractors and the du Pont Company numbered 102,570. The equivalent eight hour man days worked by these forces were 102,929.

The total number of man days on roll of the manual forces of Cost-Plus-A-Fixed-Fee Subcontractors and the du Pont Company was 319,083, which was equal to 372,310 eight hour man days. The substantial completion of the project, prior to the beginning of construction of the authorized additions, required a total of 326,745 eight hour man days of work by the manual employees of the Cost-Plus-A-Fixed-Fee Subcontractors and du Pont Company.

[REDACTED]

The total number of on roll man days of the non-manual and manual forces of the Cost-Plus-A-Fixed-Fee Subcontractors and of the du Pont Company and the forces of the Lump Sum Subcontractors exclusive of Patrol was 441,675. The equivalent eight hour man days worked by these forces exclusive of the Patrol force were 454,735.

A tabulation entitled "Data on working personnel" is shown on pages 131 & 132.

(f) Restricted Area Work

Work in restricted areas and buildings was rigidly controlled. It was necessary for all individuals required to work in restricted construction and operating areas to be cleared through the Security Agent. Character and background were the main factors in determining the clearance of the individuals. Identification of the employee was accomplished by the issuance of an area photographic pass as well as their regular pass and by the comparison of the signature on the pass with that on the register which the individual signed at the time of entering the restricted area. The register gave the date, time of entrance, and departure of each person. It was required that the area pass be surrendered to the patrolmen any time the employee left the restricted area. Both the du Pont pass and the restricted area pass were worn in full view at all times. The request for the issuance of passes to the craftsmen was approved by the Field Superintendent.

Passes for the administrative employees, visiting officials and others were approved by the Field Project Manager or Assistant Field Project Manager. The Protective Official for the Area Engineer was required to furnish the names of Government officials and employees of the Area Engineer who were authorized to enter the restricted area. A statement of the duties of each and the scope of the information which each was entitled to receive was required. The restricted area passes for this group were handled in the same manner as were the passes of the du Pont employees.

The Clinton Laboratories scheduled a shut-down of the operation of Building 105 from November 27 to December 5, 1943. During this period, late orders received after start-up were installed. At the time, the Field Superintendent prepared a schedule of the shut-down work and a list of the manpower requirements for each craft. The craft personnel was selected from men cleared by the Security Agent.

The Construction Medical Department performed medical examinations on all the men and the medical department of the Clinton Laboratories made further laboratory studies of them. Employees who sufficiently passed the combined examinations were certified individually by the construction medical department to the Field Superintendent as eligible for permission to enter the area. Certificates were issued in triplicate; the original was sent to the Field Superintendent, one copy to the Safety Supervisor and the third copy was retained in the employee's file in the Medical Department. The craft superintendents were

DATA ON WORKING PERSONNEL

<u>P E R S O N N E L</u>	*MDOR	8 HR.	*MDW	8 HR.	8 HR.	<u>A B S E N T E E I S M</u>			<u>F O R C E</u>	
		MDOR		MDW	*MDA	*A	*B	*C	*D	*E
<u>M A N U A L</u>										
DU PONT										
CARPENTERS	76819	90057	69418	81361	8696	9.656	2.753	2.298	30.343	24.900
CEMENT FINISHERS	5037	5953	4596	5424	529	8.886	0.168	0.140	2.023	1.660
IRON WORKERS	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
REINFORCING	3477	4115	2979	3526	589	14.314	0.187	0.156	1.315	1.079
STRUCTURAL	12015	14080	10700	12515	1565	11.115	0.195	0.114	4.667	3.830
LABORERS	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
COMMON	59784	71725	46853	56268	15457	21.552	4.893	4.086	20.985	17.221
RATED	57237	68682	45010	54016	14666	21.354	4.643	3.877	20.145	16.531
MILLWRIGHTS	21022	24908	19335	23021	1887	7.576	0.597	0.499	8.586	7.046
PAINTERS	4469	5278	4007	4724	554	10.496	0.175	0.146	1.762	1.446
TRANSPORTATION	26638	31081	23382	27270	3802	12.233	1.204	1.005	10.174	8.349
<u>S U B - T O T A L S</u>	<u>266498</u>	<u>315879</u>	<u>226280</u>	<u>268134</u>	<u>47745</u>	<u>xxx</u>	<u>15.115</u>	<u>12.621</u>	<u>100.000</u>	<u>82.062</u>
<u>C. P. F. F. SUBCONTRACTORS</u>										
ELECTRICAL	23139	27374	21581	25536	1838	6.714	xxx	0.486	xxx	7.815
PIPE	29446	35057	27777	33075	1982	5.654	xxx	0.524	xxx	10.123
<u>S U B - T O T A L S</u>	<u>52583</u>	<u>62431</u>	<u>49358</u>	<u>58611</u>	<u>3820</u>	<u>xxx</u>	<u>6.119</u>	<u>1.010</u>	<u>xxx</u>	<u>17.938</u>
<u>T O T A L S</u>	<u>319083</u>	<u>378310</u>	<u>275638</u>	<u>326745</u>	<u>51565</u>	<u>xxx</u>	<u>xxx</u>	<u>13.631</u>	<u>xxx</u>	<u>100.000</u>
<u>N O N - M A N U A L</u>										
DU PONT	93704	xxx	xxx	93704	xxx	xxx	xxx	xxx	xxx	xxx
C. P. F. F. SUBCONTRACTORS	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
ELECTRICAL	2935	3460	2859	3369	xxx	xxx	xxx	xxx	xxx	xxx
PIPE	5931	6948	5853	6856	xxx	xxx	xxx	xxx	xxx	xxx
<u>S U B - T O T A L S</u>	<u>8866</u>	<u>10408</u>	<u>8712</u>	<u>10225</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>
<u>T O T A L S</u>	<u>102570</u>	<u>xxx</u>	<u>xxx</u>	<u>103929</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>
L. S. SUBCONTRACTORS	20022	xxx	xxx	24061	xxx	xxx	xxx	xxx	xxx	xxx
<u>G R A N D T O T A L S</u>	<u>441675</u>	<u>xxx</u>	<u>xxx</u>	<u>454735</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>
PATROL	13013	13013	12737	12737	xxx	xxx	xxx	xxx	xxx	xxx

- *MDOR - Man Days on Roll - Regardless hours in shift.
- *MDW - Man Days Working - Regardless hours in shift.
- *MDA - Man Days Absent.
- *A - % Absentees - Manual Du Pont and C. P. F. F. Subcontractors Crafts respectively.
- *B - % Absentees of Manual Du Pont and C. P. F. F. Subcontractors respectively.
- *C - % Absentees of total manual force working.
- *D - % Craft is of Du Pont total manual force working.
- *E - % Craft is of total manual force working.

NOTE: Data obtained from Time Office Reports and records accumulated through December 11, 1943, date when Project was substantially completed and immediately prior to commencing work on additions. Saturday's On Roll and Working figures used to represent average daily employment during the week.

advised of the names of the men who were permitted to enter the area.

During the shut-down period individual emergency passes were made out by the Field Superintendent's Office, checked by the Security Agent and signed by the Safety Supervisor. The signature of the Safety Supervisor certified that the employee was covered by a medical pass. The pass was then signed by the Field Project Manager or his authorized assistants. The pass was also signed by an authorized representative of the Clinton Laboratories. Each employee was furnished a pin-on badge recording device which was worn continuously while he was in the area. These badges were surrendered to the patrolman at the gate at any time the employee left the area. Upon completion of the work, the devices were checked by the Clinton Laboratories and a record of the results was furnished to the Construction Department. The Safety Supervisor issued the required number of metal fume respirators and safety spectacles with side shields to each craft superintendent.

The construction employees were not allowed to enter any building until operations were ceased. The Safety Supervisor obtained certificates signed by an authorized representative of the Clinton Laboratories stating that the operation was shut-down and that each designated location in the area where the work was to be performed had been tested and found satisfactory for the construction employees to proceed in accordance with the shut-down schedule. The Safety Supervisor was responsible to see that the work was confined to the approved location only. It was also his responsibility to see that all of the construction employees working adjacent to the structure wore respirators and safety glasses during the performance of such work. Employees not wearing respirators and spectacles were not permitted to approach within ten feet of the structure, nor to work on top of it. A regular check was made to see that the pin-on badge recorders were worn continually by all the construction personnel working in the area. The work was conducted on two ten hour shifts per day.

The exhaust fan in Building 115 was operated during the shut-down period to maintain a suction within the structure in order to prevent the escape of any substances into the operating room.

Upon completion of the work, all the employees concerned were re-examined by the Medical Department according to the medical requirements. The results of all medical examinations, copies of all medical certificates, test certificates, restricted area passes, and records of the recording devices were filed in the individual personnel folders retained in the Construction Medical Department.

During the shut-down period, an experienced operator of the Clinton Laboratories was stationed at the control desk in order to prevent operations from being started or resumed at any time during the period.

[REDACTED]

(K) Employee Relations

(1) Steps Taken to Curb Absenteeism

Every effort was made by Management to eradicate the causes of absenteeism which was a great factor in slowing up the completion of the work on this project. Craftsmen were required to render a report to their foremen giving reasons for their absence. These reports were studied in order to ascertain the primary causes of absenteeism. The reason for absence most commonly given during the early stages of construction was the inability of the employee to attend to personal shopping needs.

A meeting was arranged with the Chamber of Commerce of Knoxville, Tennessee, relative to having the downtown retail stores remain open at least one night each week as a possible remedial step toward reducing the current high rate of absenteeism among the workers on the Clinton Engineer Works Project.

T. W. Piper of Stone and Webster Engineering Corporation, Hatfield and Rose of the U. S. Engineer Office, and Reese of the du Pont Company met with the Chamber of Commerce on April 28, 1943. The vital importance to the war effort of the Clinton Engineer Works was called to the attention of the Chamber of Commerce. The necessity of achieving stabilization of man hours and man days during the construction was emphasized and the need for positive action was asked in order to curb abnormal absenteeism among the personnel.

The project representatives expressed the opinion that there would undoubtedly be an appreciative decline in the number of absentees if the men were afforded the opportunity of cashing pay checks, of doing personal shopping, and of attending to innumerable personal affairs without having to be absent from work.

It was pointed out that, under the prevailing conditions, the men were unable to reach their homes before the stores closed and, with the ten hour day in effect, most of the retail stores were closed for the day before most of the employees were finished working. Past experience was cited indicating that where the retail merchants remained open for business only one evening each week, the percentage of absenteeism dropped considerably.

A discussion developed as to the most suitable night for the stores to remain open. It was disclosed that the Stone and Webster Engineering Corporation paid off their employees on Thursday whereas the E. I. du Pont de Nemours and Company paid off on Friday. It was suggested that if the stores agreed to stay open one night each week, the most suitable night would be Saturday, inasmuch as this was an eight hour day for all crafts, while any other day in the week was a ten hour day and that the employees working a ten hour day would be unable to get to Knoxville before seven-thirty or eight o'clock P. M. The stores reacted unfavorably to staying open either Friday or Saturday night. It was the general opinion of the members of the Chamber of Commerce that Monday night would be the most favorable night. This opinion was advanced on the theory that the employees of the contractors would be able to take advantage of the late

store hours and that it would be most beneficial to the employees of the merchants as they would have the advantage of a longer weekend, since Saturday was their most strenuous day.

Illness absences were required to clear through Medical before they were allowed to return to work and health habit advice was given to such employees. Weather protective clothing, such as raincoats and rubber boots, was provided by the Company.

A Gasoline and Tire Rationing Board was set up on the plant site in order that the employees whose means of transportation to work was the privately owned automobile were able to obtain the ration stamps and certificates without loss of time.

The length of the working day was increased from eight hours to ten hours and the policy of up-grading labor from common to rated labor classifications was established.

Bus service was provided to the project for the workers' convenience and the fare was subsidized fifty percent so that the cost to the employee was only \$1.50 for a book of twelve one-way tickets.

There was a definite shortage of restaurants in Knoxville and vicinity where transit workers could obtain a packed lunch during early morning hours. Two canteens were opened on the plant site and one at the Seabore School Dormitory in order to promote employee relations, thereby boosting morale. A discussion of the Canteen Service will be made under the item "Working Conditions - Eating Facilities."

A wage increase of $7\frac{1}{2}$ cents an hour was granted the common labor classification and became effective on July 12, 1943.

Dissatisfaction with living conditions was a primary factor causing absenteeism. The Company employed clerks to keep current lists of available housing facilities. Advertisements were placed in the local newspapers requesting people having available facilities to list them with the Company. No charge was made for this service. This factor of absenteeism was not greatly improved during the on port construction period.

An active Safety Program was carried on in order to keep injuries at a minimum and eliminate as much lost time from accidents as possible. The use of posters and slogans placed about the plant in prominent locations and office buildings was resorted to.

(2) Selective Service

The Company filed an Affidavit - Occupational Classification (Industrial) DSS Form 42-A, requesting deferment of each needed man as it became necessary. As this was a classified government project, it was impossible to disclose the nature of the work. It was considered safe to give the name and location of the plant site and to disclose the approximate number of employees in a particular department, but figures from which the total plant personnel could be computed were

avoided as much as was practicable and possible. The deferment requests disclosed the type or nature of the contract as a classified contract with the War Department and stated that the Project was vital to the Country's war effort and that the Company had been directed by the War Department not to disclose the nature of the contract or the work being performed.

On January 16, 1943, the Area Engineer's Office of the Manhattan District advised the Company that if good cause exists for the deferment of the employee in the opinion of the Officer of the Manhattan District who has knowledge of the work being performed by the contractor, he may approve the request for deferment. This may be done by a letter to the Local Selective Service Board concerned stating that this office (meaning the Manhattan District) concurs or approves the request of the contractor. They further advised that it would be proper to include a statement to the effect that the services of the employee are essential for whatever period is necessary in the completion of the work, that it is impossible to obtain a replacement, or whatever reason the Company may deem satisfactory to state.

During the construction period, the Company circularized its employees to obtain more pertinent information relative to their marital and dependency status for use in connection with the draft. Under the date of November 10th, a memorandum was issued by the Service Department relative to the immediate re-classification of delinquents into the classification of 1-A, advising all individuals that the main reasons for delinquency were:

1. Failure to return a completed questionnaire within ten days.
2. Giving false information on questionnaire.
3. Failure to register.
4. Failure to keep board advised of address where mail will reach registrant.
5. Failure to report change of status which would effect classification.
6. Failure to report for physical examination.
7. Failure to report for induction or for work of national importance.

All individuals were advised that in the re-classification of delinquent registrants, local boards would disregard order number, occupational or deferment status, although the registrant could request a personal appearance, reopening of the case of appeal, but if the local board determined that he knowingly became delinquent they would not reopen the case.

On December 16, 1943, the Manhattan District United States Engineers' Office advised the Company that the recent amendment to the Selective Service and Training Act had necessitated certain broad changes of policy related to the liaison service rendered by that office to the du Pont Company on the Clinton Engineer Works Project in their efforts to secure occupational deferments for their personnel. They informed the Company that, in accordance with the new amendment, all applications for occupational deferment were to be reviewed by the Appeal Board Panel that had jurisdiction over the locality in which the registrant was employed and that occupational deferment applications submitted would be reviewed by the Appeal Board Panel having jurisdiction over this area of the State of Tennessee, regardless of where outside this area or this state the local board of the registrant was located. It was suggested that, in order to obtain the most favorable results on deferments, their office would supply a letter for inclusion with, and in support of, requests for deferments if considered warranted. The Company was further informed that the Manhattan District United States Engineers' Office would consider deferments warranted if investigation supported the claim that a replacement was not available, regardless of the type of work performed. The Company was directed to submit all applications for men employed on the Project pertaining to occupational deferments prepared by the Company for submittal to local boards, to them for consideration. They advised that if on investigation it was determined that the application was warranted, a letter of recommendation would be attached to the application papers and forwarded to the local board and if their recommendation was withheld, the application would be forwarded to the local board without comment.

The Company filed a total of eighty-nine DSS 42A Forms requesting deferments. It was necessary to file nineteen appeals to classification. The losses to the Armed Forces of men on whom a "request" or "appeal" was filed during 1943 numbered five.

308 men were called for military service and twenty-eight enlisted up to January 9, 1944. The number terminated due to call for military service and enlistment appears by crafts in this section. Tabulated below are the number of Applications for Deferment during each month of 1943 with the various local draft boards throughout the Country, as well as the number of appeals taken:

<u>Month</u>	<u>Requests</u>	<u>Appeals</u>
March	5	-
April	2	1
May	4	-
June	10	-
July	7	2
August	1	-
September	20	1
October	15	6
November	14	-
December	13	3

Payments were made to employees entering the Services as discussed under "Benefits".

(3) Benefits

The Company provided all employees with the opportunity of obtaining Accident and Health Insurance at low cost. The condition of obtaining such insurance required that the employee must have at least six months' service with the Company. A tabulation follows showing the number of employees who shared the advantages of this type of insurance as well as the funds collected from and paid out to employees during the year 1943:

<u>Month</u>	<u>WS Roll</u>	<u>GEW Roll</u>	<u>Total Roll</u>	<u>Amount Collected</u>	<u>Amount Paid</u>
March	9	-	9	\$ 10.89	\$ -
April	12	5	17	20.57	-
May	20	13	33	62.28	-
June	21	16	37	53.24	-
July	24	15	39	47.19	-
August	24	14	38	45.98	75.00
September	28	95	123	366.63	889.27
October	26	262	290	540.45	142.86
November	27	264	291	519.07	757.11
December	23	417	440	998.82	559.29
				<u>\$2385.12</u>	<u>\$2403.53</u>

The policy was also continued of paying disability wages to employees who have had a minimum of twelve months' service with the Company. 119 employees received \$13,191.03 of this type of wages.

Vacations were given all employees who had twelve months' service with the Company and who were eligible to have it on this project. Some individuals had received all or a portion of their vacation before they were employed on this Project. 218 employees received vacation payments amounting to \$28,314, during the year 1943.

In addition to the foregoing benefits, the Company continued its policy of giving two months' pay to all persons entering the Armed Services who had at least twelve months' service with the Company. During the year 1943, eighteen such payments were made, totaling \$11,450.42.

4. Terminations

Control of terminations during the period of expansion of the construction forces was a major problem, particularly so, as the Knoxville Area was faced with a critical shortage of labor.

The Company gave an exit interview to all terminating personnel. Twenty-three reasons were established to explain causes of termination other than "Reduction of Force" and "Transfers to Other Plants".

Terminations were divided into two classifications: Voluntary Terminations and Discharges. A weekly termination report was submitted to the Wilmington Office of the Company on which were posted the weekly and accumulated terminations by craft and by reason.

A tabulation of the termination reports accumulated from the beginning of this Project through January 9, 1944, appears on Page 142. There were 3,708 terminations for reasons other than "Reduction of Force" and "Transfers to Other Plants". The following tabulation shows the terminations by percent for each reason other than "Reduction of Force" and "Transfer to Other Plants". A tabulation by craft of terminations for reasons other than "Reduction of Force" and "Transfer to Other Plants" also follows:

Bar charts of terminations by crafts are shown on Pages 142 to 157.

TERMINATIONS

REASON	PERCENT
Another Job	20.5
Personal Illness	13.2
Family Illness	11.3
Voluntary Unexplained Absence	11.2
Housing	8.6
Called to Military Service	8.3
Wages	8.3
Unknown	4.6
Insubordination	2.9
Transportation	2.9
Supervision	2.3
Unsatisfactory Attendance	0.8
Military Enlistment	0.8
Weather	0.6
Asleep on Job	0.6
Miscellaneous	0.6
Leave Town	0.6
Under Age	0.5
Liquor	0.4
Medical Reject	0.4
Fighting	0.2
Falsification	0.1
To get Married	0.1

CRAFT	PERCENT
Labor	59.2
Carpenter	11.1
Office Clerical	4.3
Truck Drivers	3.4
Machinists & Millwrights	2.8
Iron Workers	2.2
Miscellaneous	2.1
Operators	1.4
Patrolmen	1.1
Cement Finishers	0.9
Painters	0.8
Rodmen	0.4
Engineers	0.2
Instrumentmen	0.1

ACCUMULATED TERMINATIONS

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

REASON FOR TERMINATION	RETIRED	RETIRED & REEMPLOYED	RETIRED AND REEMPLOYED																	
VOLUNTARY TERMINATION																				
NONE	22	0	846	7	1	0	0													
ANOTHER JOB	120	8	478	17	1	3	11													
HOODING	40	1	120	14	1	1														
TRAFFIC & OTHER	1																			
PERSONAL ILLNESS	1	1	40	9																
FAMILY ILLNESS	17	1	14	1																
SUPERVISION	5	1	24	4																
WEATHER	6		10																	
TRAVEL DUTY	14		44				7													
TRAVEL DUTY - OTHER	0	0					0													
AUTO-TRIP	0	0	0				0													
RETIRED	14	17	10				9												10	
TO DEPARTED	0						0													
TRANSFERRED TO OTHER PLANT	2																			
RETIRED																				
MILITARY SERVICE																				
VOLUNTARY LEAVE ABSENCE																				
LEAVING JOB																				
CALLED TO MILITARY SERVICE																				
MILITARY SERVICE		1	13																3	
UNDER A LEAVE																				
RETIRED - OTHER		4	4																	
DISCHARGES																				
UNSATISFACTORY ATTENDANCE																				
FALLING BEHIND																				
DISCONTINUATION																				
DISMISSAL																				
FIGHTING	1		1				0													
UNABLE TO DO JOB			11				0													
UNWANTED FOR PRESENT WORK AND NOT AVAILABLE FOR OTHER WORK																				
ON LEAVE																				
DISCONTINUED																				
ACCUMULATED TERMINATIONS BY CRAFT																				

TOTAL TERMINATIONS

3708

VOLUNTARY TERMINATIONS

3499

WAGES	307
ANOTHER JOB	763
HOUSING	326
PERSONAL ILLNESS	489
FAMILY ILLNESS	423
SUPERVISION	87
WEATHER	21
TRANSPORTATION	107
UNKNOWN	171
TO GET MARRIED	3
MEDICAL REJECTS	14
VOLUNTARY UNEXPLAINED ABSENCE	416
LEAVE TOWN	21
CALLED TO MILITARY SERVICE	308
MILITARY ENLISTMENT	28
UNDER AGE	17

DISCHARGES

209

UNSATISFACTORY ATTENDANCE	30
FALSIFICATION	5
INSUBORDINATION	109
LIQUOR	14
FIGHTING	9
ASLEEP ON JOB	21
MISCELLANEOUS	21

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the weekly termination reports accumulated thru 1-9-44.

TOTAL PERSONNEL
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

TOTAL TERMINATIONS	159
VOLUNTARY TERMINATIONS	143
WAGES	7
ANOTHER JOB	55
HOUSING	3
PERSONAL ILLNESS	11
FAMILY ILLNESS	7
SUPERVISION	1
WEATHER	6
TRANSPORTATION	14
UNKNOWN	10
TO GET MARRIED	3
MEDICAL REJECTS	0
VOLUNTARY UNEXPLAINED ABSENCE	7
LEAVE TOWN	4
CALLED TO MILITARY SERVICE	17
MILITARY ENLISTMENT	3
UNDER AGE	1
DISCHARGES	16
UNSATISFACTORY ATTENDANCE	2
FALSIFICATION	0
INSUBORDINATION	2
LIQUOR	2
FIGHTING	0
ASLEEP ON JOB	0
MISCELLANEOUS	10

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

OFFICE CLERICAL
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

TOTAL TERMINATIONS

2561

VOLUNTARY TERMINATIONS

2561

WAGES	246
ANOTHER JOB	478
HOUSING	219
PERSONAL ILLNESS	400
FAMILY ILLNESS	343
SUPERVISION	64
WEATHER	14
TRANSPORTATION	14
UNKNOWN	102
TO GET MARRIED	0
MEDICAL REJECTS	12
VOLUNTARY UNEXPLAINED ABSENCE	304
LEAVE TOWN	7
CALLED TO MILITARY SERVICE	207
MILITARY ENLISTMENT	13
UNDER AGE	8

DISCHARGES

105

UNSATISFACTORY ATTENDANCE	22
FALSIFICATION	4
INSUBORDINATION	55
LIQUOR	5
FIGHTING	5
ASLEEP ON JOB	11
MISCELLANEOUS	3

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND RESTRUCTION OF FORCE

LABORERS AND FOREMEN

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

Data obtained from the weekly termination reports accumulated thru 1-9-44.

TOTAL TERMINATIONS

412

VOLUNTARY TERMINATIONS

402

WAGES	22
ANOTHER JOB	128
HOUSING	40
PERSONAL ILLNESS	40
FAMILY ILLNESS	45
SUPERVISION	5
WEATHER	4
TRANSPORTATION	14
UNKNOWN	14
TO GET MARRIED	0
MEDICAL REJECTS	1
VOLUNTARY UNEXPLAINED ABSENCE	55
LEAVE TOWN	2
CALLED TO MILITARY SERVICE	27
MILITARY ENLISTMENT	5
UNDER AGE	0
DISCHARGES	
UNSATISFACTORY ATTENDANCE	2
FALSIFICATION	0
INSUBORDINATION	5
LIQUOR	2
FIGHTING	1
ASLEEP ON JOB	0
MISCELLANEOUS	0

10

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the weekly termination reports accumulated thru 1-9-44.

CARPENTERS AND FOREMEN
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

TOTAL TERMINATIONS

105

VOLUNTARY TERMINATIONS

96

WAGES

7

ANOTHER JOB

17

HOUSING

24

PERSONAL ILLNESS

9

FAMILY ILLNESS

10

SUPERVISION

4

WEATHER

1

TRANSPORTATION

3

UNKNOWN

5

TO GET MARRIED

0

MEDICAL REJECTS

0

VOLUNTARY UNEXPLAINED ABSENCE

5

LEAVE TOWN

0

CALLED TO MILITARY SERVICE

4

MILITARY ENLISTMENT

0

UNDER AGE

7

DISCHARGES

9

UNSATISFACTORY ATTENDANCE

1

FALSIFICATION

1

INSUBORDINATION

6

LIQUOR

0

FIGHTING

0

ASLEEP ON JOB

1

MISCELLANEOUS

0

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the weekly termination reports accumulated thru 1-9-44. MACHINISTS AND MILLWRIGHTS CLINTON ENGINEER WORKS PROJECTS 9733 & 58

TOTAL TERMINATIONS

80

VOLUNTARY TERMINATIONS

77

WAGES

0

ANOTHER JOB

11

HOUSING

22

PERSONAL ILLNESS

11

FAMILY ILLNESS

3

SUPERVISION

6

WEATHER

0

TRANSPORTATION

7

UNKNOWN

4

TO GET MARRIED

0

MEDICAL REJECTS

0

VOLUNTARY UNEXPLAINED ABSENCE

3

LEAVE TOWN

0

CALLED TO MILITARY SERVICE

10

MILITARY ENLISTMENT

0

UNDER AGE

0

DISCHARGES

3

UNSATISFACTORY ATTENDANCE

0

FALSIFICATION

0

INSUBORDINATION

1

LIQUOR

1

FIGHTING

0

ASLEEP ON JOB

0

MISCELLANEOUS

1

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

IRON WORKERS

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

TOTAL TERMINATIONS

127

VOLUNTARY TERMINATIONS

103

WAGES

12

ANOTHER JOB

26

HOUSING

2

PERSONAL ILLNESS

4

FAMILY ILLNESS

2

SUPERVISION

1

WEATHER

1

TRANSPORTATION

15

UNKNOWN

12

TO GET MARRIED

0

MEDICAL REJECTS

0

VOLUNTARY UNEXPLAINED ABSENCE

14

LEAVE TOWN

1

CALLED TO MILITARY SERVICE

11

MILITARY ENLISTMENT

1

UNDER AGE

0

DISCHARGES

25

UNSATISFACTORY ATTENDANCE

0

FALSIFICATION

0

INSUBORDINATION

22

LIQUOR

1

FIGHTING

1

ASLEEP ON JOB

0

MISCELLANEOUS

1

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

TRUCK DRIVERS

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

TOTAL TERMINATIONS

29

VOLUNTARY TERMINATIONS

25

WAGES

0

ANOTHER JOB

3

HOUSING

3

PERSONAL ILLNESS

2

FAMILY ILLNESS

5

SUPERVISION

1

WEATHER

0

TRANSPORTATION

0

UNKNOWN

0

TO GET MARRIED

0

MEDICAL REJECTS

0

VOLUNTARY UNEXPLAINED ABSENCE

9

LEAVE TOWN

0

CALLED TO MILITARY SERVICE

2

MILITARY ENLISTMENT

0

UNDER AGE

0

DISCHARGES

4

UNSATISFACTORY ATTENDANCE

0

FALSIFICATION

0

INSUBORDINATION

3

LIQUOR

0

FIGHTING

1

ASLEEP ON JOB

0

MISCELLANEOUS

0

TERMINATIONS
REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

PAINTERS AND FORMEN
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

TOTAL TERMINATIONS	33
VOLUNTARY TERMINATIONS	31
WAGES	0
ANOTHER JOB	6
HOUSING	2
PERSONAL ILLNESS	1
FAMILY ILLNESS	1
SUPERVISION	2
WEATHER	0
TRANSPORTATION	0
UNKNOWN	13
TO GET MARRIED	0
MEDICAL REJECTS	0
VOLUNTARY UNEXPLAINED ABSENCE	0
LEAVE TOWN	0
CALLED TO MILITARY SERVICE	5
MILITARY ENLISTMENT	1
UNDER AGE	0
DISCHARGES	2
UNSATISFACTORY ATTENDANCE	0
FALSIFICATION	0
INSUBORDINATION	0
LIQUOR	0
FIGHTING	0
ASLEEP ON JOB	1
MISCELLANEOUS	1

T E R M I N A T I O N S
REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE
CEMENT FINISHERS AND FOREMEN

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

TOTAL TERMINATIONS

53

VOLUNTARY TERMINATIONS

139

WAGES	1
ANOTHER JOB	10
HOUSING	3
PERSONAL ILLNESS	5
FAMILY ILLNESS	1
SUPERVISION	1
WEATHER	0
TRANSPORTATION	2
UNKNOWN	2
TO GET MARRIED	0
MEDICAL REJECTS	0
VOLUNTARY UNEXPLAINED ABSENCE	7
LEAVE TOWN	0
CALLED TO MILITARY SERVICE	7
MILITARY ENLISTMENT	0
UNDER AGE	0

DISCHARGES

14

UNSATISFACTORY ATTENDANCE	1
FALSIFICATION	0
INSUBORDINATION	7
LIQUOR	3
FIGHTING	2
ASLEEP ON JOB	2
MISCELLANEOUS	1

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the weekly termination reports accumulated thru 1-2-44.
 OPERATORS AND FOREMEN
 CLINTON ENGINEER WORKS
 PROJECTS 9733 & 58

TOTAL TERMINATIONS

VOLUNTARY TERMINATIONS

WAGES

ANOTHER JOB

HOUSING

PERSONAL ILLNESS

FAMILY ILLNESS

SUPERVISION

WEATHER

TRANSPORTATION

UNKNOWN

TO GET MARRIED

MEDICAL REJECTS

VOLUNTARY UNEXPLAINED ABSENCE

LEAVE TOWN

CALLED TO MILITARY SERVICE

MILITARY ENLISTMENT

UNDER AGE

DISCHARGES

UNSATISFACTORY ATTENDANCE

FALSIFICATION

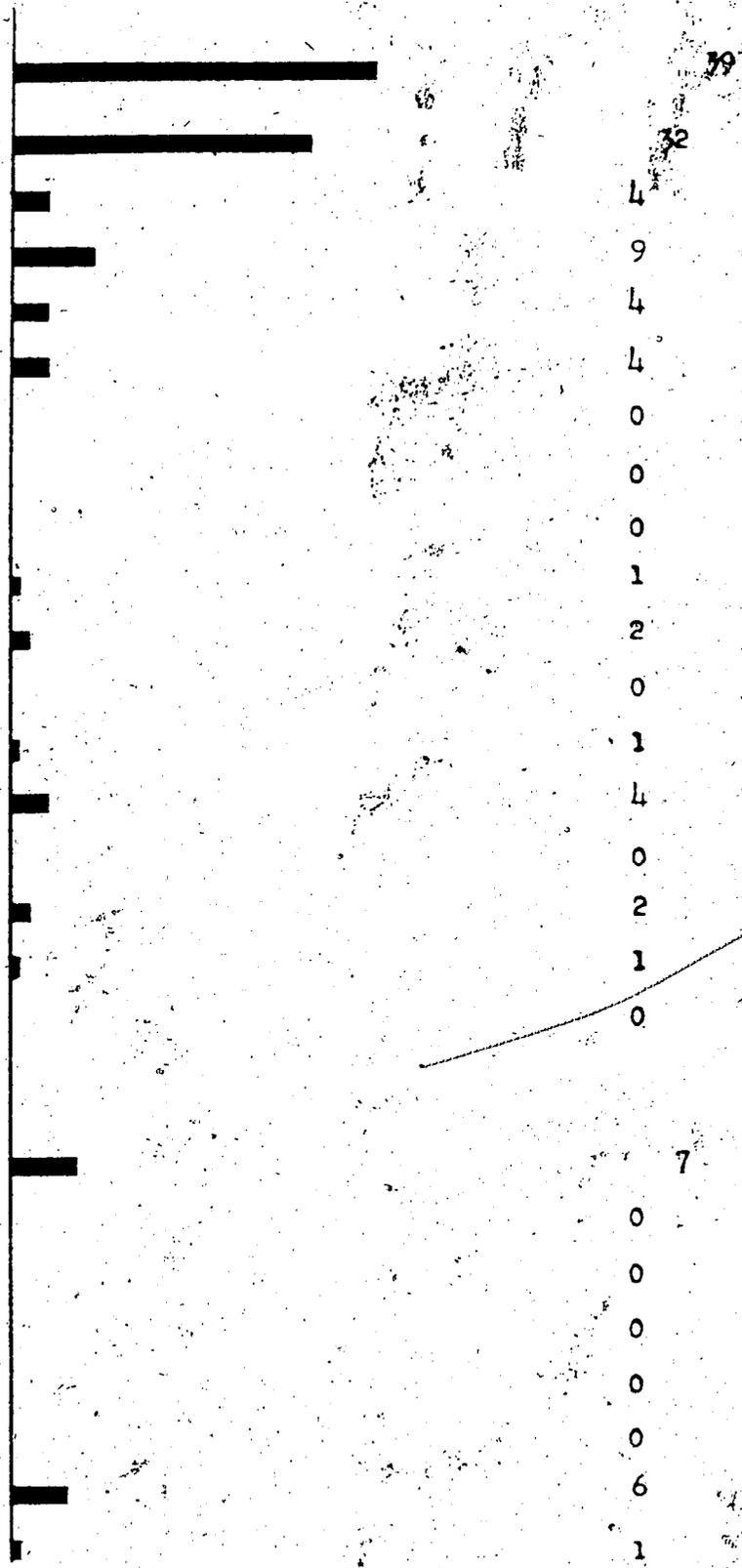
INSUBORDINATION

LIQUOR

FIGHTING

ASLEEP ON JOB

MISCELLANEOUS



TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

PATROLMEN

Data obtained from the
weekly termination reports
accumulated thru 1-9-44

CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

TOTAL TERMINATIONS

8

VOLUNTARY TERMINATIONS

8

- WAGES
- ANOTHER JOB
- HOUSING
- PERSONAL ILLNESS
- FAMILY ILLNESS
- SUPERVISION
- WEATHER
- TRANSPORTATION
- UNKNOWN
- TO GET MARRIED
- MEDICAL REJECTS
- VOLUNTARY UNEXPLAINED ABSENCE
- LEAVE TOWN
- CALLED TO MILITARY SERVICE
- MILITARY ENLISTMENT
- UNDER AGE

1
0
0
0
0
0
0
0
2
0
1
1
0
2
2
0

DISCHARGES

0

- UNSATISFACTORY ATTENDANCE
- FALSIFICATION
- INSUBORDINATION
- LIQUOR
- FIGHTING
- ASLEEP ON JOB
- MISCELLANEOUS

0
0
0
0
0
0
0

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

ENGINEERS

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

TOTAL TERMINATIONS

5

15

VOLUNTARY TERMINATIONS

5

14

WAGES

0

0

ANOTHER JOB

0

5

HOUSING

0

0

PERSONAL ILLNESS

1

0

FAMILY ILLNESS

0

1

SUPERVISION

1

0

WEATHER

0

1

TRANSPORTATION

0

0

UNKNOWN

0

0

TO GET MARRIED

0

0

MEDICAL REJECTS

0

0

VOLUNTARY UNEXPLAINED ABSENCE

1

1

LEAVE TOWN

0

0

CALLED TO MILITARY SERVICE

2

6

MILITARY ENLISTMENT

0

0

UNDER AGE

0

0

DISCHARGES

0

1

UNSATISFACTORY ATTENDANCE

0

0

FALSIFICATION

0

0

INSUBORDINATION

0

0

LIQUOR

0

0

FIGHTING

0

1

ASLEEP ON JOB

0

0

MISCELLANEOUS

0

0

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

INSTRUMENTMEN

CLINTON ENGINEER WORKS

PROJECTS 9733 & 58

obtained from the
daily termination reports
accumulated thru 1-9-44.

TOTAL TERMINATIONS

15

VOLUNTARY TERMINATIONS

14

WAGES

0

ANOTHER JOB

5

HOUSING

0

PERSONAL ILLNESS

0

FAMILY ILLNESS

1

SUPERVISION

0

WEATHER

1

TRANSPORTATION

0

UNIONS

0

TO GET MARRIED

0

MEDICAL REJECTS

0

VOLUNTARY UNEXPLAINED ABSENCE

1

LEAVE TOWN

0

CALLED TO MILITARY SERVICE

6

MILITARY ENLISTMENT

0

UNDER AGE

0

DISCHARGES

1

UNSATISFACTORY ATTENDANCE

0

FALSIFICATION

0

INSUBORDINATION

0

LIQUOR

0

FIGHTING

1

ASLEEP ON JOB

0

MISCELLANEOUS

0

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

RODMEN
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

TOTAL TERMINATIONS	76
VOLUNTARY TERMINATIONS	63
WAGES	7
ANOTHER JOB	15
HOUSING	3
PERSONAL ILLNESS	1
FAMILY ILLNESS	3
SUPERVISION	1
WEATHER	0
TRANSPORTATION	7
UNKNOWN	5
TO GET MARRIED	0
MEDICAL REJECTS	0
VOLUNTARY UNEXPLAINED ABSENCE	5
LEAVE TOWN	7
CALLED TO MILITARY SERVICE	6
MILITARY ENLISTMENT	2
UNDER AGE	1
DISCHARGES	13
UNSATISFACTORY ATTENDANCE	2
FALSIFICATION	0
INSUBORDINATION	8
LIQUOR	0
FIGHTING	0
ASLEEP ON JOB	0
MISCELLANEOUS	3

TERMINATIONS

REASONS OTHER THAN TRANSFERS AND REDUCTION OF FORCE

Data obtained from the
weekly termination reports
accumulated thru 1-9-44.

MISCELLANEOUS
CLIFTON ENGINEER WORKS
PROJECTS 9733 & 58

It is to be noted that the labor craft accounted for 89.2% of the total terminations for reasons other than "Reduction of Force" and "Transfer to Other Plants".

The Corps of Engineers requested the Company to send terminations lists to them. It also advised du Pont that a few of the laborers who previously worked for the Company were re-hired by the Stone and Webster Engineering Corporation and vice versa. In all cases the laborer failed to inform either company of his previous employment at Clinton Engineer Works. It was agreed that no steps would be taken to release such employees.

The problem of control of terminations was of general concern for all employers on the Clinton Engineer Works. On July 30, 1943, the Corps of Engineers advised the United States Employment Service and the War Manpower Commission that it would be necessary for the organization to furnish an average of 198 laborers per day in order to meet the employment needs of the whole project. This estimate took into consideration an average daily loss of seventy laborers. During the week beginning August 1, 1943, an average of one hundred and ninety-two laborers were hired per day. The average loss per day was 122.

On September 21, 1943, the Corps of Engineers instructed the du Pont Company to notify them in advance of any contemplated lay-offs due to the urgent need for all types of labor by the various contractors on the Clinton Engineer Works Project.

Region Seven was operated under the War Manpower Commission Employment Stabilization Plan. In June, 1943, du Pont adopted for use on this Project, the Stabilization Plan Termination Slip which contained a statement which read that "we do or do not agree to the release of a specified employee".

Two types of Statements of Availability were issued: One type was for those employed in non-critical occupations; the other, called Restricted Statement of Availability, for use for those employees working at occupations classified as critical by the War Manpower Commission. The first type of Statement of Availability could be taken by the individual to any other employer for any essential or local needed activity. The Restricted Statement of Availability used for the employee working at a critical occupation required the individual to take the Restricted Statement of Availability to the Office of the United States Employment Service serving the employer for possible assignment.

Craft Superintendents were instructed that when a reduction of force was contemplated, to prepare a "Cull" list of those men who did not have sufficient ability. No man was included on such list who had more than ten months service with the Company unless adequate proof of the man's inability accompanied the list in written form. Additional "Cull" lists were obtained from the Medical and Reference Departments and a master list for terminations was compiled by the Personnel Supervisor. After this latter list

was exhausted, reductions of force were made entirely on a basis of service with the Company.

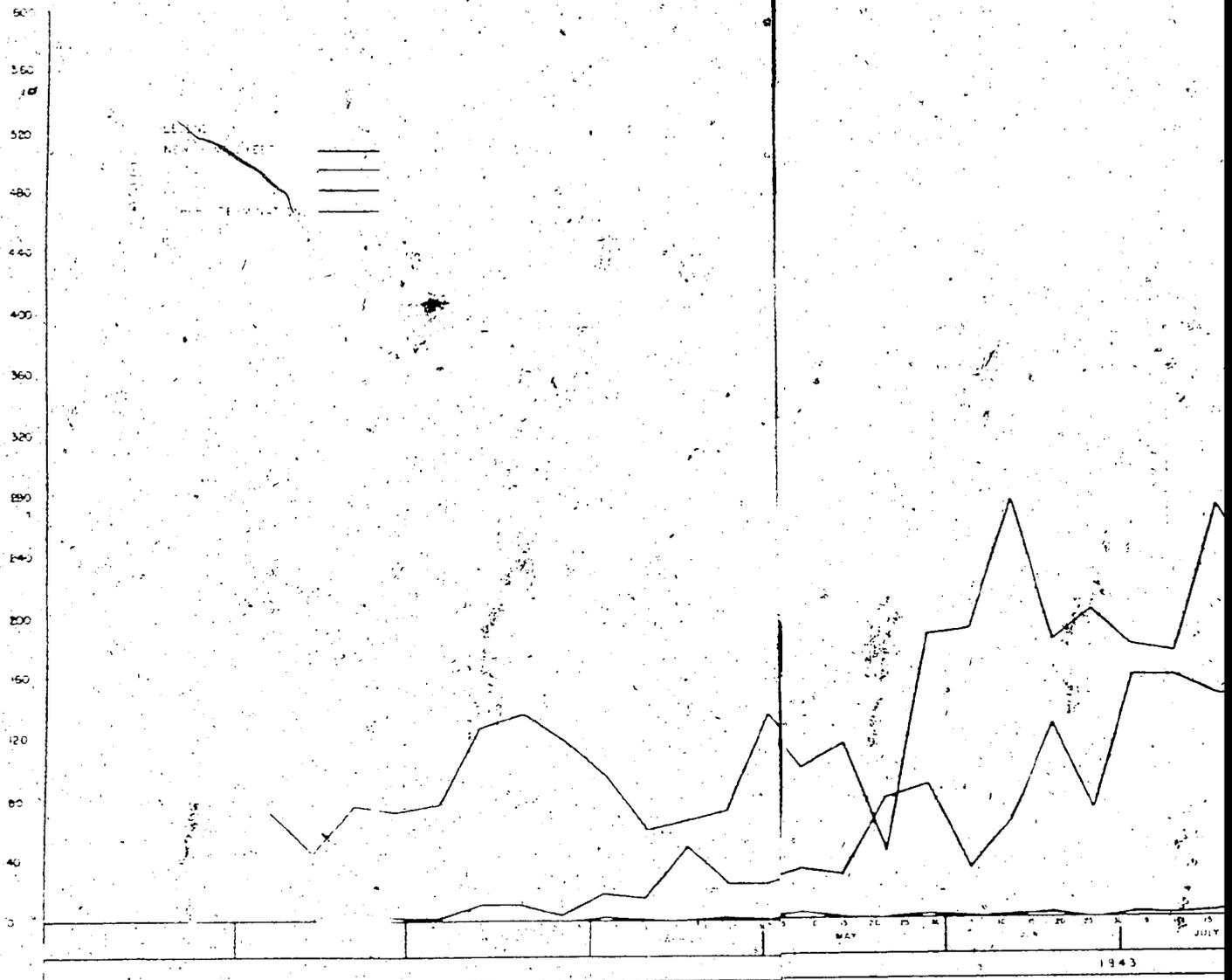
Beginning in October, 1943, no reduction of force terminations were made on Saturdays or Holidays.

On June 22, 1943, the Corps of Engineers advised the Company that there had been several cases where government employees had been approached by contractors with offers of employment and, in most cases, at increased compensation. They further stated that in the future, no government employee could be contracted by any contractor or subcontractor regarding possible employment, and that no releases would be granted the Government employees for employment with any contractor or subcontractor on this Project.

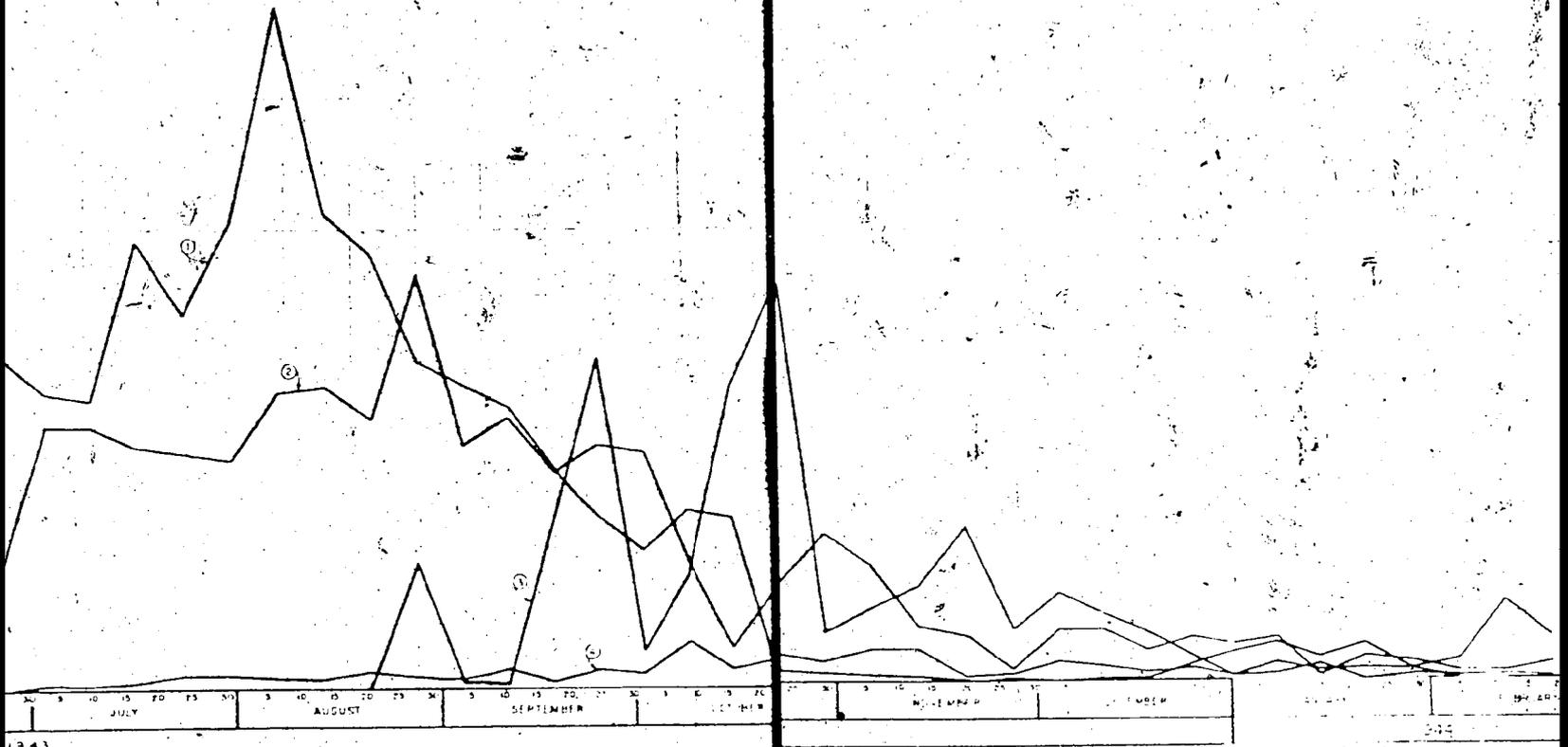
The contractors and subcontractors were also instructed to refrain from contacting employees of any other company working on the Project unless prior clearance to do so was obtained from the employing contractors.

Strict adherence to the aforesaid policy by all contractors and subcontractors was directed. The prime contractors were charged with the responsibility of notifying their subcontractors of these requirements.

A chart entitled "Weekly Rate of du Pont Employment and Terminations" appears on Page 159. The peak rate of all types of terminations including "Reduction of Force" and "Transfers to Other Plants" was reached during the week ending September 5, 1943. The first reduction of force termination was made during the week ending August 28, 1943.



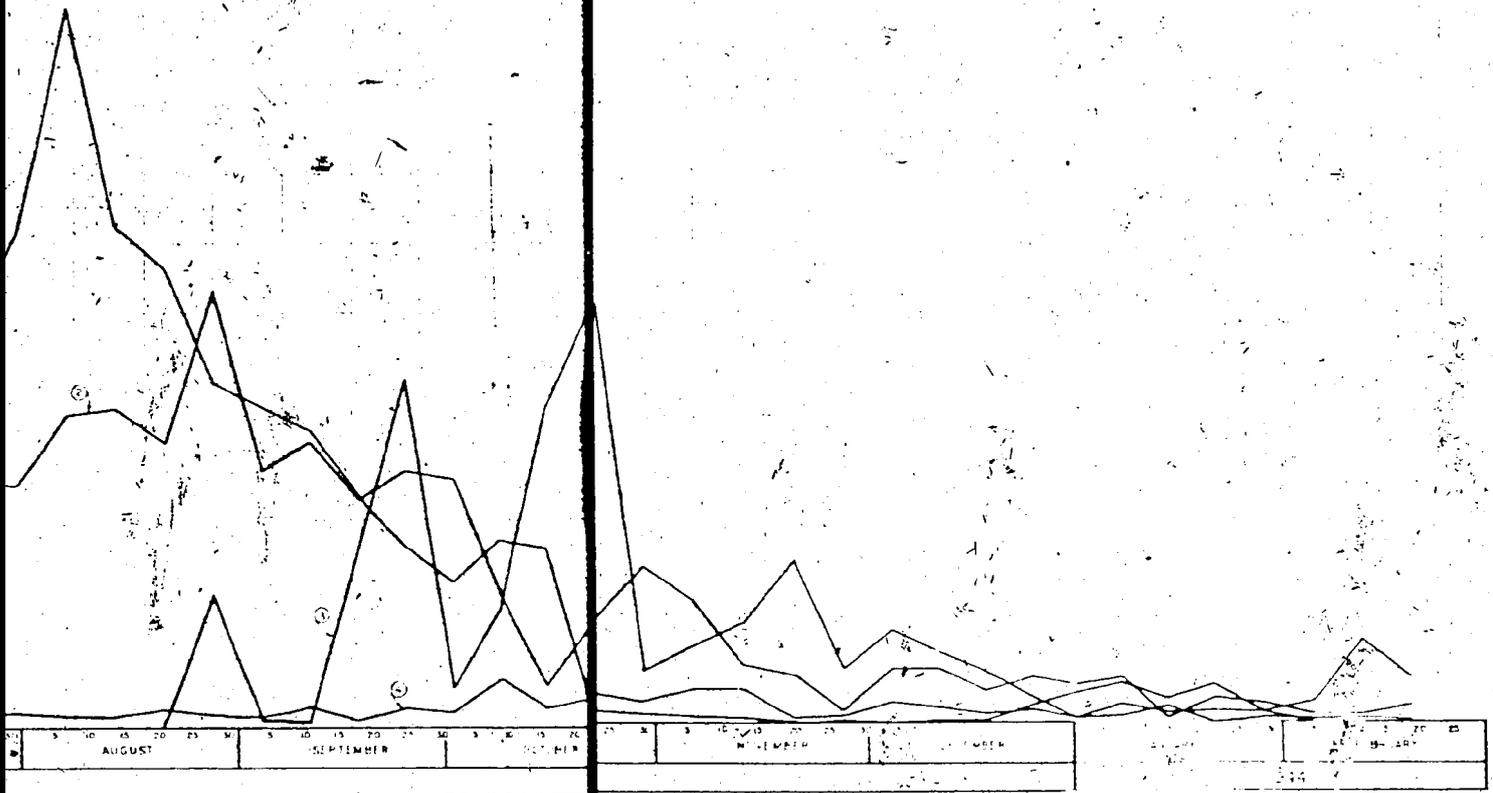
WEEKLY RATE OF DU PONT EMPLOYEES
 CLINTON ENGINEER WORK
 PROJECTS 9733-B-5B



1943

EMPLOYMENT & TERMINATION
 ENGINEER WORKS

9733 B 5B



TERMINATION

Living Conditions

Housing Facilities

A review of the file of the employment record cards of the personnel determined the localities in which the construction workers lived. It was found that the metropolitan area of Knoxville, Tennessee, provided a large percentage of employees with housing facilities. Approximately 65% of those working on the du Pont Project lived in this area. The recruited laborers who were housed at the Scarboro School and the Hutment Area amounted to 23% of the employees. The remaining 12% of the workers obtained living quarters at Clinton, Harriman, Lenoir City, Alcoa, Maryville, Sevierville, Rytington, and other near-by communities in Tennessee.

The living quarters of the City of Knoxville consisted of approximately 24 hotels, 135 apartment houses, 18 tourist courts, 25,000 private homes providing 39,160 dwelling units, 1 government colored housing settlement and 1 government white housing settlement, as well as numerous trailer camps.

The critical housing condition existed in the vicinity of the Clinton Engineer Works prior to the time the Company became active on the project and remained so throughout the entire period of construction here. The scarcity of housing facilities was due to the increased local industrial and construction activity in connection with the War Effort.

By the end of May, accommodations for labor were practically non-existent. Approval was obtained from the Area Engineer for the temporary housing of recruited laborers at the Stone & Webster Hutment Area until the Scarboro School Building could be converted into a dormitory.

Conversion work on the School Building was started on June 9, 1943, and the first laborers were moved into the new quarters during the week of June 20, 1943. The Company continued to avail itself of the facilities of the Hutment Area as the Scarboro School facilities were of insufficient size to provide quarters for all of the recruited labor working on the project. Modern services such as electric lights, steam heat, hot and cold running water were not available in the Scarboro School. Necessary furnishings were furnished by the Company. The occupants paid a lodging fee which was obtained by authorized payroll deduction. The dormitory was managed by two du Pont Labor Foremen.

The maximum number of laborers housed at the Scarboro School Barracks at one time was 286 and the maximum number housed at the Hutment Area was 268. A peak of 541 laborers found quarters on the reservation. This maximum was reached during the first week of October. On November 7, 1943, the du Pont Company ceased to use the facilities of the Hutment Area.

A tabulation, by weekly periods, of the number of laborers living on the reservation and sub-tabulated into those living at the Scarboro School and at the Hutment Area appears on page 164.

In the early part of May, 1943, the government began to recognize the critical housing situation created by the influx of construction workers at the Clinton Engineer Works Project.

Initially, all news items were currently addressed to the public by the newspapers of this area appealing to the property owners to list rooms and living accommodations with the Office of Civilian Defense, which was cooperating with the Chamber of Commerce of Knoxville in a drive to obtain a complete list of all available quarters for the rapidly expanding population in the area.

The City Manager of Knoxville and the Army officials also made appeals requesting the people of the vicinity to assist in the housing of the War Construction Workers. The demand for housing far exceeded the supply.

House to house canvasses were conducted by various groups in order to obtain living quarters for the new people coming to the area. Resort areas were also combed to obtain space. Additional drives were made at various times during the stay of the construction forces of the du Pont Company.

On August 1, 1943, the Company employed two clerks for the purpose of obtaining housing facilities for its employees. A housing office was opened at the Town Office of the Company.vertisements were placed in both daily papers of Knoxville for a period starting August 5, 1943, requesting local property owners to list all available property and rooms with du Pont. No charge was made to the people for property and rooms so listed. These efforts were futile and did not produce satisfactory results.

The use of quarters on the government reservation, such as the houses and dormitories located at the Town Site, was denied du Pont construction employees. Attempts were made to obtain the use of the government house trailers located on the reservation but the Company was unsuccessful in obtaining the release of any of these for its employees.

General Grove was kept advised relative to the housing difficulties encountered by the employees of this Company. The problem became more critical as additional prime contractors began construction. There was no solution to the problem--the Company was unable to provide satisfactory facilities for all employees to work on the project. This condition was due to the high percentage of absenteeism and the weather.

The road mileage from the various near-by municipalities to the du Pont Plant Site are as tabulated below:

Alcoa, Tenn.....45	Miles	LaFollette, Tenn.....46	Miles
Byington, Tenn.....14	"	Lake City, Tenn.....31	"
Clinton, Tenn.....22	"	Lenoir City, Tenn.....12	"
Fountain City, Tenn..29	"	Maryville, Tenn.....46	"
Harriman, Tenn.....33	"	Norris, Tenn.....29	"
Inskip, Tenn.....27	"	Sevierville, Tenn....54	"
Knoxville, Tenn.....30	"		

Listed below are the census figures for this area which show the increase in population since 1940:

	<u>1940 Census</u>	<u>1945 Estimated Population</u>
Metropolitan Area.....	151,829.....	209,000
Knoxville.....	111,580.....	130,000
Clinton.....	2,761.....	6,000
Harriman.....	5,620.....	7,000
Lenoir City.....	4,573.....	6,000
Maryville.....	5,609.....	13,000
Alcoa.....	5,131.....	8,000

A. B. Pruitt, a former employee of the Real Estate Division of the Fidelity Bankers Trust Company of Knoxville, hired by the Company to handle gasoline and tire rationing for the du Pont employees, assisted key personnel in locating permanent houses and facilities in Knoxville and vicinity during the first few weeks of his employment.

During the early part of May, 1943, the Company was advised that the Stone & Webster Engineering Corporation was, at that time, making plans to house approximately 500 laborers on the site. The Company was also advised about the same time by E. H. [redacted], Local Manager of the United States Employment Service, that he would not issue clearance for recruitment of labor outside of the local Knoxville area without first having definite assurances that living quarters were available for the men.

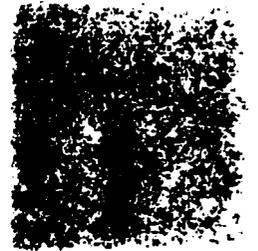
The Wilmington Office, when advised of the requirements of the United States Employment Service, authorized J. D. Wilson, Field Project Manager, to employ a competent realtor to conduct a housing survey and maintain a current list of available facilities for a period of 60 days. This action was approved by the Area Engineer, who further suggested that the Seabore School Building be converted into a dormitory for both white and colored employees.

The Company requested several of the well known realtors of the City of Knoxville to submit proposals for conducting a housing survey. The companies contacted were the Fidelity Bankers Trust Company; [redacted] Realty Company; Claiborne, Lethrop & [redacted] [redacted] & Reehl, Inc.; Andrew Jones; and E. H. [redacted]. All of the above companies, with the exception of Andrew Jones, stated that they were unable to submit a proposal and not have sufficient personnel to obtain and maintain current listings. Negotiations were carried on with Andrew Jones and when it became apparent that the arrangement was not working satisfactorily, negotiations were terminated.

On May 18, 1943, a colored housing clerk was employed and a door-to-door housing survey was made to obtain listings of residences willing to provide accommodations for colored laborers. This survey met with fair success and by May 19, 1943, quarters were located for approximately 50 colored laborers. The average room rent for colored employees was \$3.50 per week and the average

[REDACTED]

for white workers varied from \$5 to \$8 per week.



**NUMBER OF RECRUITED LABORERS
LIVING ON THE RESERVATION**

<u>DATE</u>	<u>BARBORO SCHOOL</u>	<u>HUTCHINT AREA</u>	<u>NUMBER LIVING ON RESERVATION</u>
6-13-43	0	40	40
6-20-43	50	40	90
6-27-43	119	34	153
7-4-43	89	11	100
7-11-43	109	5	114
7-18-43	169	36	205
7-25-43	158	68	226
8-1-43	243	36	279
8-8-43	259	163	402
8-15-43	153	167	300
8-22-43	178	211	389
8-29-43	212	190	402
9-5-43	214	206	420
9-12-43	233	202	435
9-17-43	190	158	348
9-26-43	286	154	440
10-3-43	275	268	543
10-10-43	220	190	410
10-17-43	227	148	375
10-24-43	173	107	280
10-31-43	222	78	297
11-7-43	194	1	195
11-14-43	158	0	158
11-21-43	153	0	153
11-27-43	150	0	150
12-5-43	123	0	123
12-12-43	113	0	113
12-19-43	98	0	98
12-26-43	70	0	70
1-2-44	62	0	62
1-9-44	66	0	66
1-16-44	67	0	67
1-23-44	70	0	70
1-30-44	63	0	63
	59	0	59
	41	0	41
	0	0	0

2. Commuting Facilities

At the start of construction for the TNX area, no public transportation facility provided service to that vicinity. Residents of the area were dependent upon private means of transportation. Roads leading to the plant site were unimproved and were several miles distant from nearest improved highways.

Employees of the Company had to rely entirely upon privately owned automobiles, busses, and Company operated shuttles for transportation. The use of shuttle trains over the Louisville and Nashville Railroad was adopted by several prime contractors at Clinton Engineer Works Project but this service could not be used by the du Pont personnel because of the distance of the TNX Area from the nearest rail connection.

A graph entitled "Use of Transportation Facilities", showing the number of employees using the various means of transportation, is shown on the following page. Privately owned automobiles transported the bulk of the workers to and from the plant.

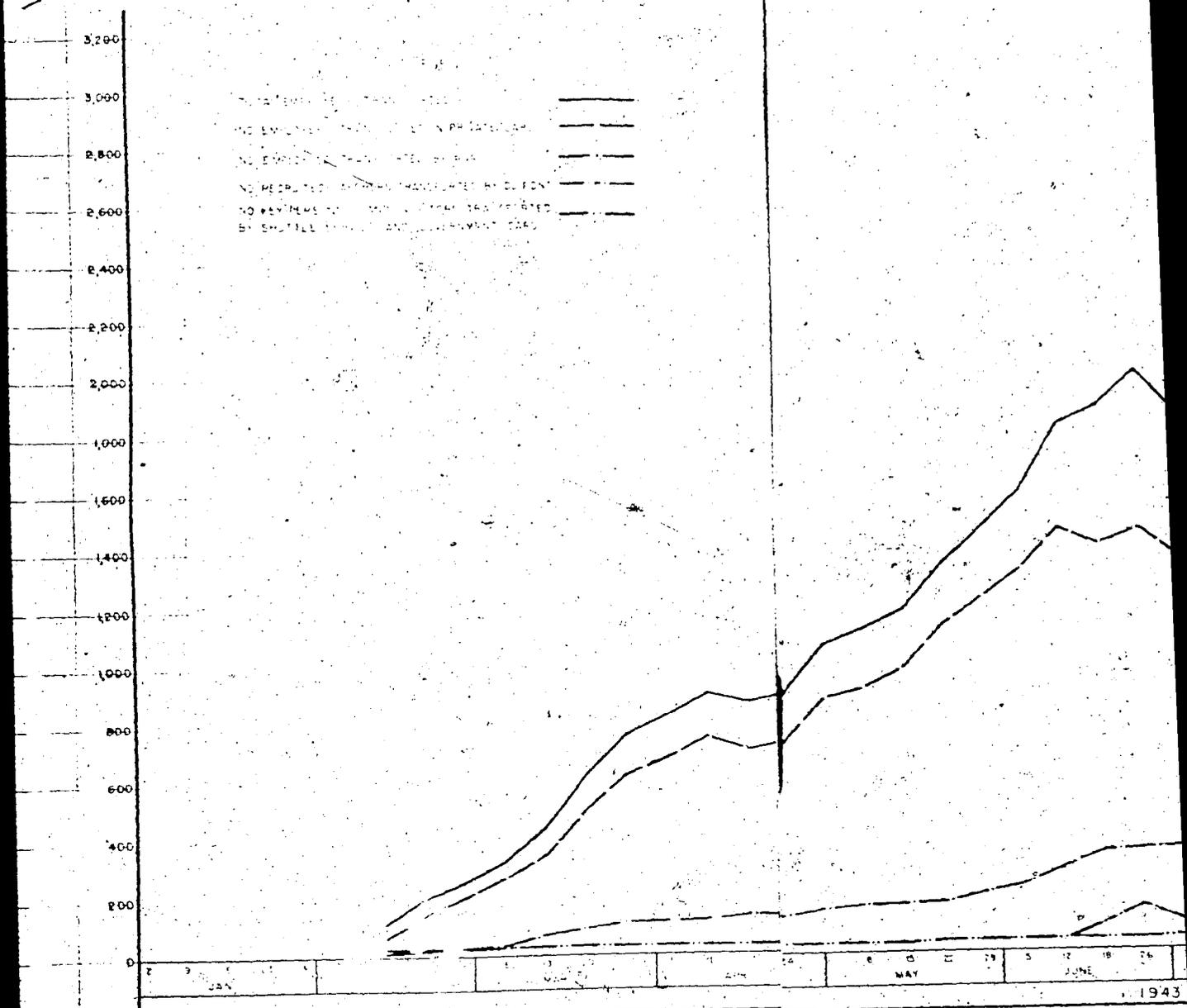
A ration board, known as the Clinton Engineer Works War Price and Ration Board, Number 4729, Anderson County, Tennessee, was set up to handle the rationing problems of employees working on the government reservation.

The prime contractors on the project were permitted to set up Sub-Panel Ration Boards for the convenience of their employees and to assist them in obtaining gasoline and certificates for tires and tubes.

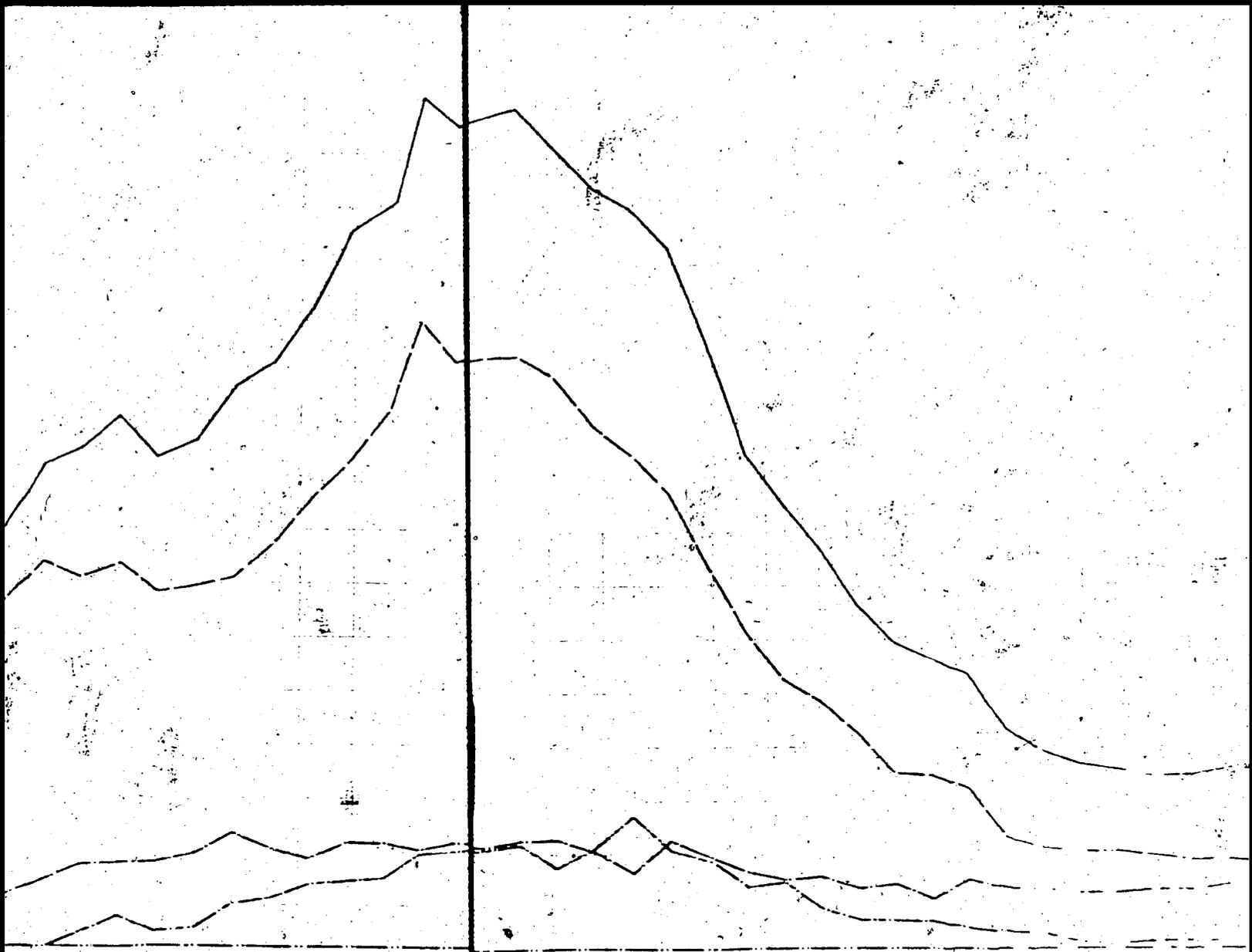
The du Pont Sub-Panel Board was opened on February 1, 1943, at the Town Office of the Company located at 422 W. Cumberland Avenue, Knoxville, Tennessee. For the further convenience of the employees, this board was moved to the plant site on May 1, 1943. The du Pont Ration Board consisted of two employees, who met weekly with the members of the parent board. One of the board members was a representative of the office personnel and the other was a representative of the field employees.

Gasoline was unlimited in this locality. Tires and tubes were rationed in accordance with a certificate system. From April 1, 1943, to December 1, 1943, 1,734 car owners obtained ration certificates for gasoline from this board. Also, during the aforesaid period, 869 "A" books, 184 "B" books, 3,158 "C" books, and 2,695 "Special" books were issued to the employees. During the same period, 1,734 certificates for tires and 829 certificates for tubes were issued by the du Pont Ration Board.

The White Wing Ferry, owned by C. L. White of Knoxville, Tennessee, provided a crossing over the Clinch River for employees living in the vicinity of Lenoir City, Tennessee, going to work via Loudon County Road.



1943
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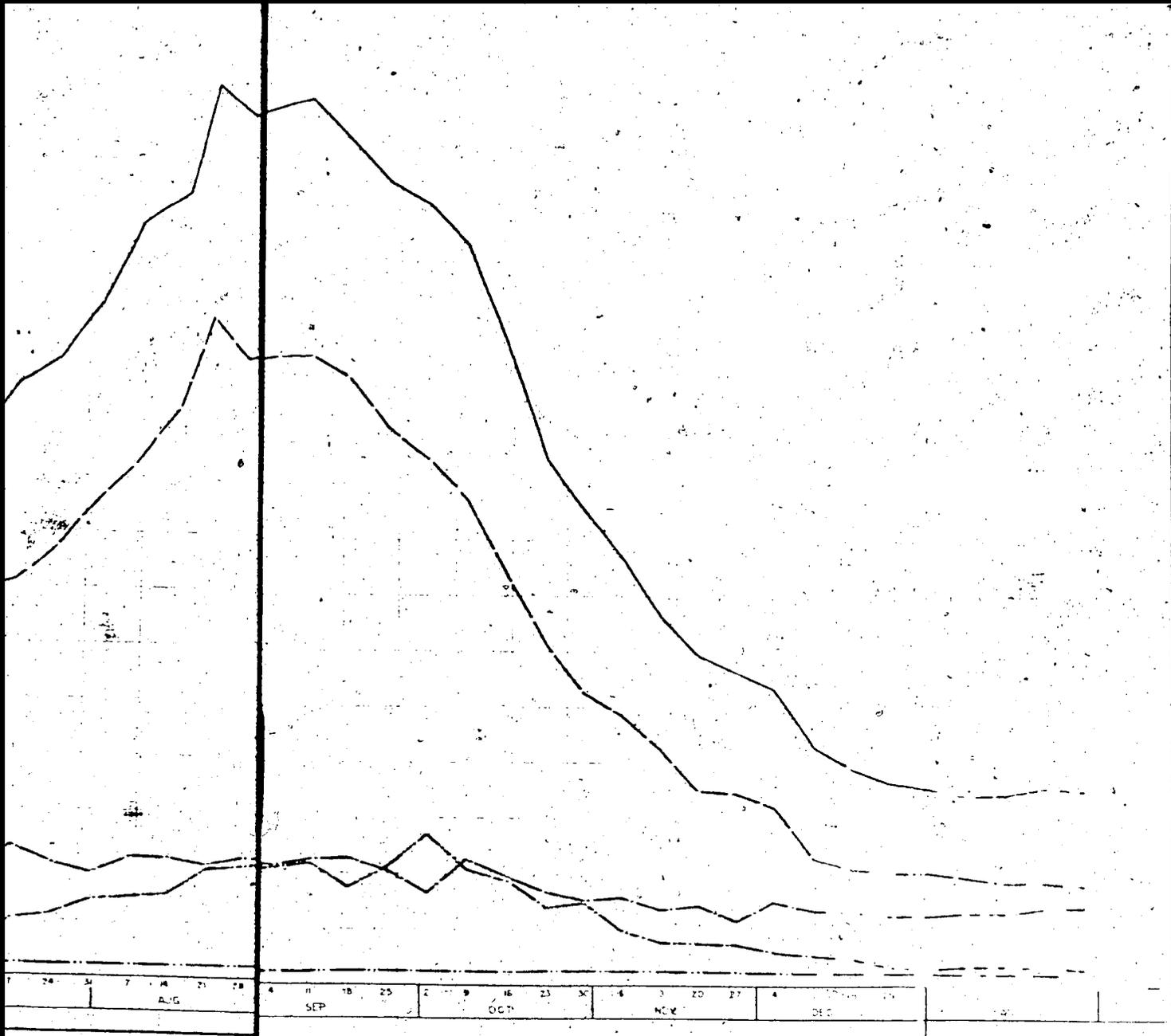


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																		
JUNE							JULY							AUG							SEP							OCT							NOV							DEC						

1943

USE OF TRANSPORTATION FACILITIES
 CLINTON ENGINEER WORKS
 PROJECTS 9733 B5B

8



RTATION FACILITIES
 MEER WORKS
 733 B5B

In July, 1943, the ferry was offered for sale to the J. A. Jones Construction Company, who contemplated moving it downstream to a point opposite their project site. The du Pont Company, in order to provide its employees with the continued use of the ferry and in order to eliminate the necessity of employees from that district driving an additional distance of 60 miles a day, entered into an agreement on July 14, 1943, with the owner of the ferry for the continuation of its use at the existing location. For this consideration, the Company agreed to make all necessary repairs to the equipment and to pay all premiums for workmen's compensation, public liability, and property damage insurance for the period of one year. The Company further arranged for furnishing the operator of the ferry a vacant building, rent free, located on the reservation adjacent to the ferry. The agreement further provided that all revenue derived from the operation of the ferry was to be retained by the owner. The foregoing agreement was approved by the Area Engineer. The fare was maintained at 25 cents per car, which included fees for driver and passengers. At one time, approximately 100 employees used the service of the ferry commuting to and from work. Employees of other contractors at Clinton Engineer Works also used this ferry.

A survey was conducted by the Company for the establishment of bus service from Lenoir City to the plant site by way of the ferry. The purpose of the proposed service was to eliminate the traffic congestion existing at White Wing Ferry, as the ferry was hand-operated by means of cables and required considerable time for each crossing. Bus service between Lenoir City and the plant was never placed in operation, as a sufficient number of passengers could not be found to warrant the service.

(b) Private Automobiles

A majority of the employees engaged in the construction of this project commuted by means of privately owned cars. During the peak construction months of September and October, a daily average of 1,762 employees were transported in private automobiles, or approximately 71.6% of the force employed at that time. The peak was reached during the week ending August 21, 1943, when it was found that 2,378 workers were transported daily in private automobiles. A survey was conducted by the Traffic Department of the Company during the week ending June 12, 1943, which revealed that each car was carrying an average of 3.1 passengers. Based on this figure, approximately 767 cars were used at the peak.

The distance driven daily by these cars varied from approximately 30 to 150 miles; however, the average distance was about 75 miles. Transportation by means of privately owned cars was handicapped somewhat due to the shortage of rationed tires and tubes. Even though the Ration Board issued certificates for tires and tubes, the individual had to locate a dealer who had a supply.

(c) Bus Service

Early in the construction period, bus service was established but, due to the lack of adequate equipment and to the scattered residences of the employees, bus service was utilized only to a limited extent.

Bus service to the field construction offices, located at Scarboro School and at the plant site, was inaugurated on February 8, 1943. The Local Bus Lines, operated by W. C. King of Knoxville, Tennessee, was granted an extension to their franchise between Knoxville and Scarboro, Tennessee, by the Railroad and Public Utilities Commission of Tennessee in a document, Number KC-1800, dated February 18, 1943, in order to provide passenger service to the du Pont Plant Site, 7 miles beyond Scarboro, Tennessee.

On February 24, 1943, the Commission awarded W. C. King, operator of the bus line, certificates of convenience and necessity to operate a motor carrier in the transportation of persons and their baggage between Tecoy and Scarboro, Tennessee, over Ball Camp Road, Solway Road, Emory Road, Byington-Solway Road, and over the city streets of Knoxville, Tennessee, to their bus terminal. This addition to the franchise gave the bus company a certain flexibility in routes to and from the plant site.

The route most commonly used by the Local Bus Lines was from the Union Bus Terminal, Knoxville, via Union Street to Commerce Street to Western Avenue, thence to Ball Camp Road and over Byington-Solway Road to Solway Bridge, thence to Bethel Valley Road to Scarboro School and to the plant site. Passengers were picked up and discharged along this route.

The first bus schedule to be put into effect was as follows:

BUS SCHEDULE

KNOXVILLE, TENN., TO FIELD OFFICE & PLANT

	1st Run	2nd Run
Leave Union Bus Station.....	6:15 A.M.	- 7:00 A.M.
Arrive Field Office (Scarboro School)....	7:15 A.M.	- 8:00 A.M.
Arrive Plant Site.....	7:30 A.M.	- Note: 2nd Run to Field Office only.

PLANT SITE TO FIELD OFFICE & KNOXVILLE, TENN.

Leave Plant Site.....	4:45 P.M.
Leave Field Office.....	5:05 P.M.
Arrive Union Bus Terminal, Knoxville.....	6:00 P.M.

This schedule was maintained until the number of passengers warranted an increase in this schedule and additional service for shift workers.

The fare originally charged was \$2.50 for a book of twelve one-way tickets or 35 cents for a one-way cash fare. Tickets were placed on sale at the Union Bus Station, 326 South Gay Street, Knoxville, Tennessee. This fare was increased on May 24, 1943, to \$3.00 for a book of twelve one-way tickets from Knoxville to the du Pont Plant Site. This increase was approved by the Railroad and Public Utilities Commission as the overall distance from Knoxville to the plant site was 35 miles, which exceeded the distance originally stipulated.

Approval was obtained from the Area Engineer for the subsidization by the du Pont Company of 50% of the bus fare. The Company was advised by the government that this amount would be reimbursable under the contract. This plan was placed in effect on May 24, 1943, and the price of bus tickets was reduced to \$1.50 per book of twelve tickets. Arrangements were made for the sale of tickets at the plant site and their sale at the Union Bus Terminal was discontinued. This reduction in price was available only to the Cost-Plus-A-Fixed-Fee Subcontractors and du Pont employees.

Subsidization of bus transportation by other contractors at Clinton Engineer Works had been practiced for some time before it was placed in effect by the du Pont Company. It was made possible for new employees lacking necessary funds for transportation to be furnished a commuter book upon signing Payroll Deduction Authorization. A definite increase in the use of the bus service was made by the employees after the adoption of the subsidization plan.

The Local Bus Lines used 14 busses during July, August, September and October, peak transportation months. The average number of passengers transported monthly for this period was 12,395, which was equal to an average of approximately 400 round-trip passengers daily. At this time, this common carrier was conveying about 15.8% of the total employees on this project. A total of 75,120 passengers made use of this service from February 8, 1943 to December 1, 1943.

(d) Shuttle Service

Initial shuttle service was established between the Knoxville Office, Seabrook School and the plant site. This service also provided delivery of mail four times daily as well as the transportation of new employees, officials of this project and visiting officials to the plant site. Twelve government-owned vehicles were assigned to this project for this purpose. During the peak of construction, an average of 54 passengers per day were transported by this service.

The Company was required to furnish, at no charge, shuttle service for all du Pont employees housed at Stone & Webster Hutment Area and the Seabrook School Barracks. Tarpaulin covered flat-bed trucks, outfitted with wooden benches, were used for this service, which began during the week ending

June 12, 1943. During the week ending October 10, 1943, a peak of 541 men were transported daily by this means, requiring a fleet of 21 trucks. An average of 395 employees were transported to and from the site during the period from August 1, 1943, to November 1, 1943, by the Company. This average represented about 10.9% of the total force working at the time.

3. Recreation

There was a definite shortage of recreation and amusement facilities available in the vicinity of Knoxville during the after-work hours and between shifts for the employees of the Clinton Engineer Works Project.

The metropolitan area of Knoxville contained fourteen motion picture houses; however, these were not open at any time on Sundays except on three occasions when one of the theaters was permitted to show pictures--one for charitable purposes and two to promote the sale of War Bonds. The influx of workers and their families greatly overtaxed these facilities.

There were several night clubs in the area and two country clubs, Holston Hills Country Club and the Cherokee Country Club, all of which were in the radius of ten miles of Knoxville. The city contained two municipal parks, Chilhowee and Tyson Park. Practically all counties in the vicinity of the Project prohibited the sale of liquor.

Knoxville supported a baseball club known as the Knoxville Baseball Club, which was a member of the Southern League.

Radio programs were provided over the three broadcasting network systems: Columbia, National, and Mutual.

The University of Tennessee, located in Knoxville, offered War Training Courses for those who were interested. Collegiate competition of various types were brought to this area by this institution as well as some musical programs. Various nationally known fraternal organizations, lodges, and clubs had chapters in the City.

The National Park known as the Smoky Mountain National Park was located approximately fifty miles from the City of Knoxville and afforded the possibility of such recreation as swimming, hiking, fishing, and in winter, skiing. The Cherokee Indian Reservation also was located within the boundaries of this park.

Five dams of the Tennessee Valley Authority were located within fifty miles of Knoxville: Norris Dam, Watts Bar Dam, Cherokee Dam, Douglas Dam, and Fort Loudon Dam. The lakes created by these dams provided facilities for swimming, boating and fishing.

The use of the resort areas was greatly restricted due to the rationing of gasoline and tires. This factor greatly overburdened the few amusement facilities of Knoxville and was not a factor to create good morale.

G. WORKING CONDITIONS

1. Safety and Fire Protection

(a) Organization

The personnel consisted of a Safety and Fire Protection Supervisor, and Assistant Safety and Fire Protection Supervisor, two Safety Engineers, a clerk, a stenographer and a laborer. The Assistant Safety and Fire Protection Supervisor and one of the Safety Engineers were assigned to the night shift. The department was organized around trained Safety Engineers whose supervision covered both du Pont's and sub-contractors' employees. During the early stages of construction the department was seriously undermanned due to the rapid expansion of force.

The high rate of personnel turnover, changing plans and lack of information due to the type of work presented many problems which were not present on other projects.

(b) Duties

The department's program was based primarily on educating all employees to recognize hazards and needs and to practice sound safety and fire protection methods. Orientation talks were given to all new employees by the Safety Engineers. Daily office and field inspections were made to assist the field in correcting hazardous conditions before accidents occurred.

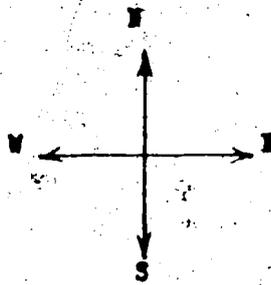
Fire Protection was under the jurisdiction of the supervisor. All fire-fighting and the greater part of fire inspection was performed by the United States Engineer's Fire Company under the direction of the supervisor. Office groups were organized for the orderly evacuation of buildings in the event of fire and several fire drills were held during the course of construction.

For the purpose of fire protection during the early stages of construction, temporary reservoirs were constructed of earthen embankments placed across the streams passing through and in the close vicinity of the plant site. These were used in connection with the fire protection equipment furnished by the government until the underground water system was completed and available for use. On page 173 appears a plat of the fire zones established for the plant and the signalling system employed. The entire road system on the Government Reservation is shown on page 172. This latter map was used for police and fire control by the Area Engineer.

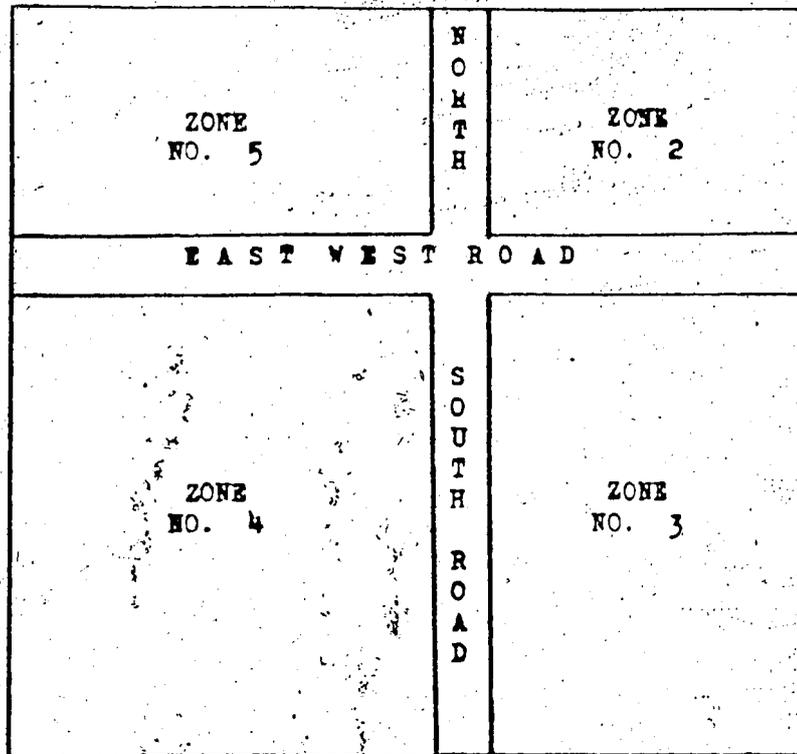
(c) Program

(1) Committees

A Safety Policy Committee was established in connection with the program and consisted of the Field Project Manager,



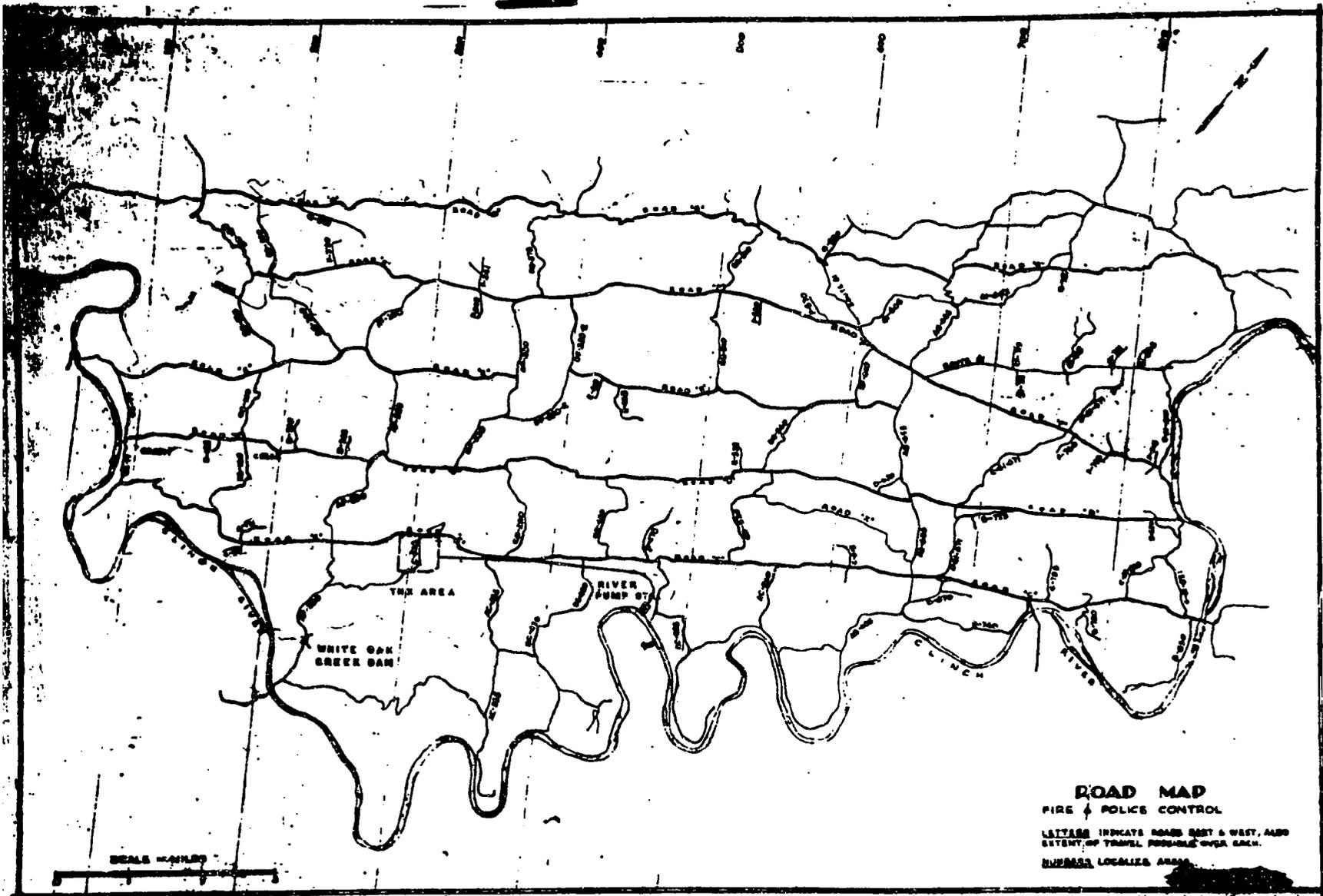
P
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ZONE 2 - 2 BLASTS - 5 TIMES
ZONE 3 - 3 BLASTS - 5 TIMES
ZONE 4 - 4 BLASTS - 5 TIMES
ZONE 5 - 5 BLASTS - 5 TIMES
ZONE 6 - 6 BLASTS - 5 TIMES

*(All outlying sections of
the plant not covered by
above)

FIRE ZONES AND SIGNALS
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58



Assistant Field Project Manager, Field Superintendent, Control Superintendent, Engineering Office Superintendent, Service Superintendent, Safety and Fire Protection Supervisor, Medical Supervisor and Patrol Supervisor. The committee considered and placed into effect numerous suggestions made by various employees, established insurance plant safety programs, and recommended action by the Corps of Engineers of off-plant conditions which indirectly effected the safety and general morale of du Pont employees.

A Safety Planning Committee was also established and forecasted work placing special emphasis on hazardous construction. The general work forecast was available to supervision through the issuance weekly of a Project Safety Forecast Bulletin to assist in planning and safety. This committee was made up of the Field Superintendent, Division Engineers, Craft Superintendents, Safety Engineers and Patrol Supervisor.

(2) Meetings

Weekly Safety Meetings were sponsored by the Safety and Fire Protection Department and attended by gang foreman, gang superintendents, supervision above foremen and engineers. Craft superintendents conducted weekly safety meetings with the supervision from the craft. The Monday 15 Minute Safety Meeting was conducted by each gang foreman with his employees.

In order to provide planned safety for all office personnel, meetings were held every other week.

Project mass meetings were held on occasion to increase Safety Morale and to emphasize the importance that the du Pont Company placed on "Safety in Construction."

(3) Inspections

A weekly inspection tour of all offices and construction work was made by a committee consisting of a Division Engineer, a Craft Superintendent, a Craft Foreman and a Safety Engineer. Membership of this inspection committee was changed each week. The inspection tours noted hazardous conditions and made correction in the time the hazard was observed. Special emphasis was placed on housekeeping and at the completion of the tour the area in which area, shop, office or building should receive a "Blue Ribbon" award for having the poorest housekeeping was made of wood. Later, as the effectiveness of this award program, a "Blue Ribbon" award for good housekeeping was made weekly. Department groups also made inspections periodically as part of their safety program.

(4) Safety Analyst

A Safety Analyst was appointed on the Project for the purpose of critically analysing the progress and efficiency of the Safety Program. A study was made and the findings reported on June 3, 1943. The report stated that the development of safety

morale on the project had in the interval dating from the starting of the field operations to that date progressed at a greatly accelerated rate, considered in line with the strongly administered overall safety program of the Construction Division.

(5) Safety Task Assignment

The use of the safety task assignment proved to be of invaluable assistance in preventing injury to new employees during the period required for them to become familiar with the working conditions and provided excellent means of insuring safety training with new inexperienced craftsmen. It also provided a means of securing safe performance of employees who could not be given constant safety supervision by their foremen and furnished a check for new foremen in that it required that they secure instruction in order to give adequate safety task assignments.

(6) Government Policy

The government advised that its policy in regard to the safety program would be confined to recommendations and improvement of the safety program of the Company. The Government Safety Engineer would advise of any unsafe conditions existing, the correction of which were to be left entirely in the hands of the Company except when life was in jeopardy, in which case the Government Safety Engineer would take action.

(7) Citation Plan

With the inauguration of the 1944 Safety Performance Citation Plan, safety morale improved remarkably especially so when considering that this project was entering the period of closing down of construction. The Citation Plan instilled new interest for more active participation of supervision in accident prevention through competitive incentive. The acknowledgement awards consisted of a pin recognizing the classifications of Sergeant, Lieutenant, Captain, Major, Colonel and General. Promotion from one rank to the next higher was possible every two months. One scoreboard was used for foremen, another for supervision above foremen and ratings were made each week during the construction period. This program established positive safety leadership and was of particular interest to supervision in that their rank moved along with them to other projects under the jurisdiction of the Company.

(8) Statistics

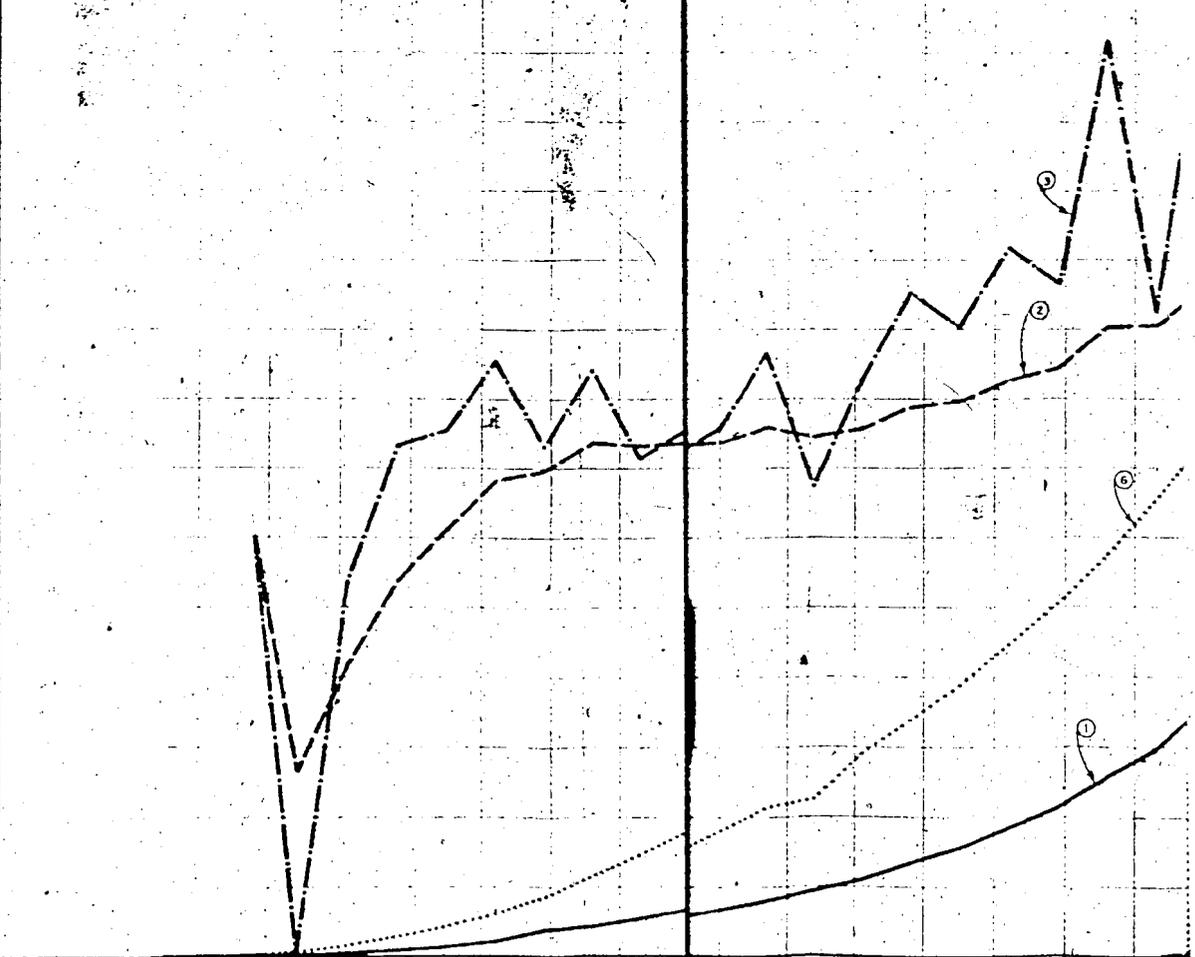
As of March 28, 1944, a total of seven major injuries were charged against the Project. On page 176 is a photostat which is entitled "Safety" on which appear six curves as follows:

- 1- Total number minor injuries
- 2- accumulative minor injury frequency
- 3- Weekly minor injuries
- 4- Major injury severity rate
- 5- Major injury frequency rate

1,600,000	1.0	1	1	3,700
1,400,000	2.8	70	4	2,100
1,300,000	7.6	65	11	2,400
1,200,000	2.4	60	12	2,400
1,100,000	7.7	55	11	2,200
1,000,000	3.0	50	10	2,000
900,000	1.8	45	9	1,800
800,000	1.6	40	8	1,600
700,000	1.4	35	7	1,400
600,000	0.7	30	6	1,200
500,000	0	25	5	1,000
400,000	1	20	4	800
300,000	6	15	3	600
200,000	4	10	2	400
100,000		5	1	200
0	6	2	0	0

LEGEND

- 1 TOTAL NUMBER OF MINOR INJURIES
- 2 ACCUMULATED MINOR INJURY FREQUENCY RATE
- 3 WEEKLY MINOR INJURY FREQUENCY RATE
- 4 MAJOR INJURY SEVERITY RATE
- 5 MAJOR INJURY FREQUENCY RATE
- 6 EXPOSURE HOURS SINCE LAST MAJOR INJURY



6	4	1	1	4	2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12							
JAN										FEB					MAR					APR				MAY				JUNE							
EXPOSURE HOURS SINCE LAST MAJOR INJURY	FREQUENCY RATE	MAJOR INJURY SEVERITY RATE	MAJOR INJURY FREQUENCY RATE	MINOR INJURIES	TOTAL																														

S
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PRC

3- Exposure hours since last major injury

The latter curve was plotted from information available through December 31, 1943, and since that period three additional major injuries have been back-charged to the project. On this chart also appears a short description of each major injury.

As of February 27, 1944, 2730 minor injuries were reported. A comparative chart of the frequency and severity accident rates of various contractors working on the Government Reservation appears on page 178. The frequency rates on this chart are injuries per million employees' hours and it shows that the Du Pont Company has the lowest rate of any of the construction and operating contractors. Skidmore, Owings & Merrill shown as construction contractors did not have a field construction force.

(a) Miscellaneous Information

In order to prevent injuries, safety shoes and gloves were sold on the project as a safety and welfare feature. The cost to the employee of these items was established at cost less discount plus freight and was revised as necessary. The selling of the safety shoes and gloves was approved by the area engineer on February 5, 1943 subject to the furnishing of shoe rationing coupons by employees in accordance with existing regulations and also that any profit accruing from the operation of the plan would be paid to the United States and tend to reduce the cost of the work. Safety goggles were provided all employees requiring them.

The Du Pont Company assisted all subcontractors in the establishment of their safety program. Subcontractors were required to comply with all pertinent provisions of the "Safety Requirements in excavation - building - construction" as issued by the War Department.

The use of the various types of fire extinguishers was demonstrated and explained to employees on various occasions.

2- Patrol

(a) Organization

The personnel of the Patrol Division consisted of a Patrol Supervisor, one captain, three lieutenants, and four sergeants and a number of patrolmen. This number was considerably larger than originally anticipated due to the fact that posts were established away from the plant site and due to the protection required for restricted areas. The principal functions of the department were to prevent trespassing on this restricted area, to prevent damage or sabotage to government equipment and property, and to safeguard working personnel, and to enforce other Dupont and government regulations.

(b) Personnel

CLINTON ENGINEER WORKS

ACCIDENT RATES

1943

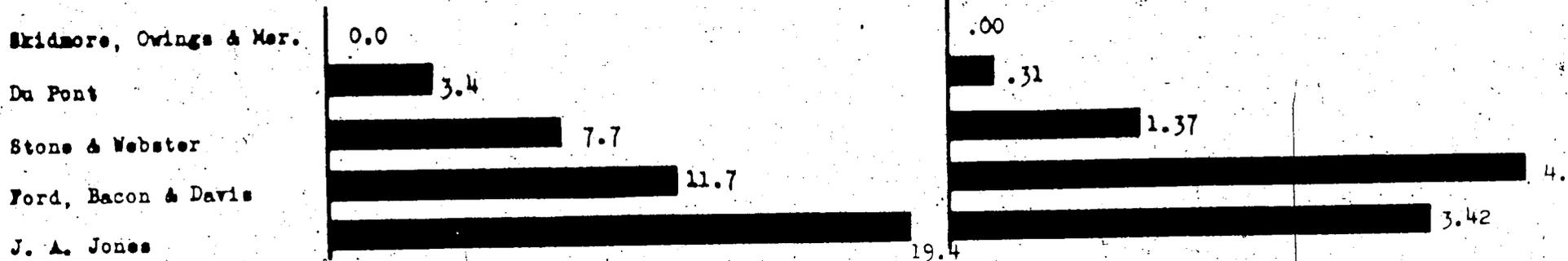
FREQUENCY RATES **SECRET**

Injuries per Million Employee-Hours

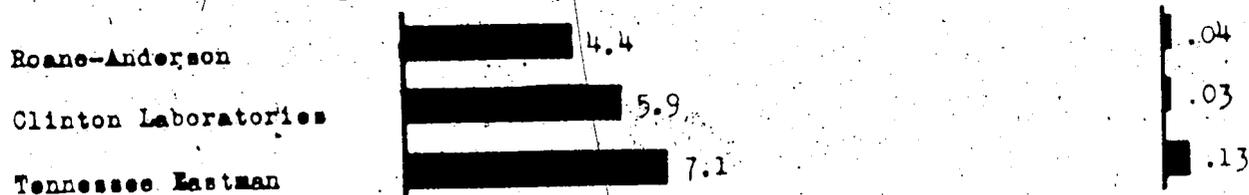
SEVERITY RATES

Days Lost per Thousand Employee-Hours

CONSTRUCTION CONTRACTORS



OPERATING CONTRACTORS



U. S. ENGINEER DEPARTMENT



Prepared by
Safety-Accident Prevention Section
U. S. Engineer Department
January, 1944

Skidmore, Owings & Merrill - Prime Contractors -
No Field Construction Force
Figures based on Prime Contractor's and all CRFF,
LS & UP Subcontractors' Employees.

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(1) Requirements

Standards were set up for personnel as to education and physical qualifications. Each patrolman received one hour's training each week on general duties of patrol work. Uniforms, necessary arms and other required equipment were furnished to the patrolmen. Horses with equipment were used to patrol the water line from the plant site to the River Pump House which territory was inaccessible to motor vehicles. Difficulty was encountered in obtaining qualified personnel and the standards had to be somewhat lowered.

(2) Coverage

Patrol provided 24 hour coverage of the offices maintained in Knoxville, the Scarboro School and the Plant. Coverage was also provided the B. F. Shaw Company's office at 313 West Cumberland from 11 A.M. to 7 P.M. daily, except Sundays, until their offices were moved to the plant site.

Beginning in July the River Pump House was provided with 24 hour coverage, two men on night and one on day shift.

Prior to the time of completion of the outer fence, employees were checked for proper identification upon entering the site and were required to show identification if called upon.

The fence line and gates were manned on April 20, 1943. Guard towers were manned starting July 15, 1943.

(3) Temporary Armed Patrol

Although arrangements had been made in April to swear the patrol into the Civilian Auxiliary to Military Police, this did not take place until September 1943.

In July 1943, the Area Engineer assigned four armed guards to guard temporarily certain files in the Clinton Laboratories' Administration Building. On August 28, 1943, thirty additional armed guards were provided by the Area Engineer for protection of certain valuable material on the site. These guards were not permitted to enter the plant site, but maintained guard duty outside the site. The armed guards assigned to this project by the Area Engineer were withdrawn upon the swearing in of the patrol to the Civilian Auxiliary to the Military Police. At that time arms were turned to the patrolmen effective at 4 P.M. September 13th.

(c) Orders and Reports

Orders for the Patrol were issued by the Patrol Supervisor and by the following methods:

- 1- General orders
- 2- Specific orders
- 3- Daily orders

4- Post orders

All reports were submitted to the Patrol Supervisor. Special reports requiring additional action were forwarded to the Service Superintendent. The reports required were:

- 1- Unusual events
- 2- Suggestion blanks
- 3- Vehicle and employee check sheets
- 4- Regulation conditions
- 5- Shift lieutenant's report
- 6- Dynamite reports
- 7- Gun report
- 8- Off-day schedule

The Patrol was responsible for the enforcement of pass procedure.

3 Medical

(a) Organization and Duties

The personnel of the department consisted of a Medical Supervisor, two Assistant Physicians, four nurses, one stenographer, and two clerks. One physician was assigned to the Knoxville Office and conducted pre-employment examinations there. He also made disability wage calls in Knoxville and called on employees who were confined to their homes or to hospitals because of illness or accident. One physician was assigned to the Field to assist in First Aid and with the execution of the various other phases of the organization.

A large group of physicians were employed on a pay basis to examine employees at the location at which they were recruited for the labor craft.

The four nurses worked three shifts seven days per week with one day off each week and 24 hours off between shift changes. Their duties were to give First Aid treatment and dressings, to give physio-therapy treatments, and to assist the physician whenever necessary. A nurse accompanied the ambulance on all calls and trips. The nurses were responsible for the maintenance of the First Aid files and each nurse was responsible for the completion of the individual record of any employee she treated.

The duties of the stenographer were to type all correspondence, and reports, and to assist with the medical files and all general office procedure.

One clerk, titled "Absentee Clerk", was located in the Knoxville Office until that office was discontinued. One clerk worked in the Medical Supervisor's office and checked the daily service cards of all absentees and obtained the adjusted service dates on all employees who were absent on two or more consecutive days. A file on Disability Wage, A & H Insurance and Industrial

Compensation was maintained which contained a complete record on these cases. She assisted with the filing and general office work. The department cooperated fully with the Safety Department and maintained control over sanitation and public health.

(b) Examinations

The Department gave free employment examinations to all employees to determine if the individual was physically qualified to do the job for which he was applying. All employees were required to pass through the Medical Department regardless of whether they were new, reemployed, reinstated, or transfers. In the latter two cases, the examination was for the purpose of determining whether there was any change in the condition of the employee during the interim between jobs. Certain physical standards had to be met by the employee.

During the early stages of labor recruitment, it was the Company's policy to have its own physicians travel with the labor recruiting crews. The shortage of capable physicians made this program impossible and the use of physicians in localities at which labor recruitment was being done, was necessary. The local physicians were advised regarding the type of men desired, physical requirements, extent of examination required, and the examination fee to be paid.

All employees with more than one year's service were required to take an annual physical examination, which in addition to a complete history and physical check up, included chest X-ray, serology, and other laboratory tests. Special examinations were given in occupations that had added health hazards. Medical examinations were given all employees transferred from this project to another.

Termination examinations were given also to employees when the employee had had an injury which he had not reported, an injury from which he has not entirely recovered, a complaint in regard to medical procedure or treatment, a question as to disposition of his case, or partial permanent disability which had not been rated. In cases of discharge and always except in unusual cases terminations for other causes, employees were interviewed and a complete history obtained. All employees were required to clear through the Medical Department at the time of termination and to sign "No Injury" slips.

(c) First Aid

First aid diagnosed and treated minor injuries and illness and gave emergency treatment to accident cases of more serious nature.

The disposition of plant injuries were made in one of the following manners:

- 1- Discharged- no further medical attention required

- 2- Returned to regular work - which was used when the injury did not incapacitate an employee from doing all the phases of his job.
- 3- Guided work - this was an effort on the part of the Company to protect an employee's earning power and was designed to conserve manpower. Each craft maint ined a list of various guided work jobs. Guided cases were required to secure work within their own department and at a task that otherwise required someone to do it. Jobs were not made for guided work cases and guided work was only for the duration of the period required for the patient to recover sufficiently to pursue his regular duties and not for the duration of the project.
- 4- Patients were referred to outside physicians for consultations and special treatment.
- 5- Patients were referred to hospitals for treatment.

4 Feeding Facilities

Meals and put up lunches were difficult to obtain in the City of Knoxville due to the greatly expanded population of that city. No facilities of any sort were available at the plant site for feeding the employees until June 23, 1943. The personnel had to rely entirely upon carried lunches up to that time, when canteens were opened on the construction site.

Two canteens were located on the Plant site and one at the Scarboro School Dormitory. Hot and cold drinks, candy, tobacco, and sandwiches were sold. In addition items of clothing and sundry toilet articles were sold at the Scarboro School location. The canteens were open for use during all working hours. One was located in the vicinity of the Administration Building and was used by both office and field employees. The other located adjacent to the main construction area was used almost exclusively by the field employees.

The canteen in the administration area was closed on October 15, 1943 and that in the field on November 18, 1943. The Scarboro School canteen was discontinued in October 1943.

The total cost of equipment required for the canteens amounted to \$2,301.41. The total sales during the contract period amounted to \$47,732.86. Expenses of operation were established at \$2,410.11. Inventory value at closing was placed at \$07.80. The operator in his earning statement showed a net loss of \$4,170.55.

In July, 1943, the cafeteria was opened by the Clinton Laboratories for the convenience of certain construction personnel as well as their employees. The use of the cafeteria for construction personnel was limited to those employees in the Administration Building, the Employment and Medical Building, and the Construction Offices. Field personnel of the following classifications were

permitted to obtain meals there: Division engineers, Craft Superintendents, Subcontractor's Superintendents, department heads and their respective direct assistants. At the start breakfast was not available.

The first labor recruited were fed at a cafeteria in the out-plant area on the reservation. Later some of this group were fed at the Plant Cafeteria, beginning July 26, 1948. The use of the Plant Cafeteria for feeding men residing on the reservation was discontinued December 18, 1948 so that the addition to the cafeteria could be started.

5 Sanitation

(a) Water Supply

During the initial stages of construction, drinking water was obtained from springs located on the construction site. Laboratory analysis indicated that these sources of supply were unsafe and were contaminated. Therefore it was necessary to obtain drinking water from another source. The supply at the Seabrook school was satisfactory from a chemical and bacteriological standpoint, but the quantity was insufficient for the needs of the Plant. Drinking water was obtained from the municipality of Clinton, Tennessee, a distance of approximately 80 miles from the construction site. All drinking water was hauled in by truck until the permanent plant supply was obtained. A well was drilled on the construction site to develop a water supply for drinking purposes but it was found that the supply was contaminated and the well was never used for drinking water.

Water barrels were placed at convenient locations on the construction site. New barrels were treated with a solution of 15% HTH having a strength of 200 p.p.m. This solution was maintained in the barrels for at least one hour. The barrels were then emptied and rinsed with water containing 2 p.p.m. of HTH. The barrels were then filled with water from an approved source and sufficient HTH added to provide a solution of 2 p.p.m. The water barrels were emptied daily and fresh water and HTH added. Once each week the barrels were rinsed with a solution of HTH having a strength of 100 p.p.m. To the water used for drinking purposes, sufficient HTH was added to provide a solution having a strength of 2 p.p.m. The HTH is a commercial chemical product which has a certain proportion of free Chlorine. Each barrel was provided with a lock to prevent the possibility of sabotage and to prevent workmen from using the barrels for other purposes than obtaining drinking water.

Beginning July 29, 1948, the drinking water was obtained from the filter plant located on the site. Laboratory tests proved this source satisfactory from the standpoint of both bacteria count and type. The amount of available chlorine in this water was maintained at approximately 1 p.p.m. although on occasion the available chlorine has been as high as 3 p.p.m.

The construction Medical Department continued to check the

drinking water supply in all buildings occupied by the construction personnel. The Clinton Laboratories tested the water in all buildings which had been turned over to them. Drinking water facilities are further discussed under Temporary Construction.

(b) Latrines

Separate latrines were provided for colored and white employees. The Area Engineer on April 1, 1943, recommended that in the interest of health and sanitation that: (a) pre-existing privies be razed and that no attempt be made to salvage the material, (b) cisterns and cess pools containing refuse and material of questionable nature be chemically treated and back-filled, (c) wells be back-filled, (d) pig styes and similar unsightly enclosures be eliminated, the refuse be removed, and the area be corrected.

Prior to the time Honey Hill was ready, pans from the latrines were emptied into a temporary trench. The pans were rinsed with lye water followed by rinsing with carbolium. The procedure used after Honey Hill was placed in operation was as follows: The pans were collected from the toilets by the "Honey Crew" and taken to Honey Hill where emptied into the pit following which they were cleaned with hot water to which lye had been added. Then they were steamed until clean. After the steam treatment the pans were cleaned with a solution of carbolium of which a small amount was retained in the pan. The carbolium solution proportion was 1 to 250.

Men working on the "Honey Crew" were sent to Medical every two weeks for inspection, especially as to any open lesions or breaks in the skin that could become infected and for evidences of chemical irritations. These men were provided with suitable boots, gloves and other equipment.

(c) Food Dispensing Establishment

On October 4, 1943, the Area Engineer established sanitary requirements for cafeteria and food dispensing establishments on the Reservation and directed that the regulations be adhered to by all managements of cafeterias and other food dispensing establishments, such as canteens and lunch counters. Food handlers were required to have a complete physical examination and no physician was permitted to issue a certificate to food handlers without a complete physical and laboratory test. Certificates were issued every three months at which time a blood Wasserman test and throat culture for diphtheria was made. Chest x-rays were made every six months. Hygienic and sanitary requirements were stipulated.

(d) Mosquito Control

Five species of mosquitoes are found in eastern Tennessee, the control of which was important from a sanitary point of view because of the probability of transmittal of disease. Solutions were added to fire barrels located at various points on the Project site in order to eliminate breeding points. Several swamp areas were drained and certain ponds developed for the purpose of fire

protection were treated with an oil solution to prevent the breeding of the insects. The control program was aimed mainly at exterminating the larvae Swamp areas and small ponds within 1 mile radius were treated, providing effective control.

6. Morale

In general the morale of the employees working on the Project was extremely low and Management made every effort to raise this most important factor in construction work. Low morale was indicated by the high rate of absenteeism and the high rate of personnel turnover. Factors contributing to this state of affairs were: lack of adequate housing in the vicinity of the construction site; the long distance to the Project from the communities housing the bulk of the employees; and the inability of the employees to attend to personal business. Other factors contributing although not of such major importance were: the difficulty of obtaining meals, lack of adequate transportation facilities, and limited recreational facilities in the nearby vicinity.

To combat low morale, management held several mass meetings at which representatives of the government and the Company addressed the employees. The Company took an active part in obtaining an agreement from the Chamber of Commerce of Knoxville to have the stores remain open one night a week. Canteens were opened on the Project site for the convenience of the employees during all work hours. A "Victory Committee" was established, the purpose of which was to impress the employees here with the importance of their work on the "Home Front". Exhibits of enemy equipment captured were displayed in a prominent location on the project site. The employees were addressed by injured members of the Armed Services who had returned from active duty. The Company employed a housing clerk in order to assist its employees in obtaining suitable quarters. All of these items have been discussed in more detail in various sections of this report.

Safety morale was ~~improved~~ appreciably by the inauguration of the Citation Plan which has been discussed under Safety.

Morale was the most difficult problem with which management had to cope in the construction of this project.

H. Wages and Hours

1. Wage Rates

Upon agreement between the contracting agencies of the U. S. Government and the Building and Construction Trades Department of the American Federation of Labor, this project was operated under the Wage Stabilization Plan, the details of which are stated in the memorandum of agreement between the representatives of the government agencies engaged in war construction and the Building and Construction Trades Department of the American Federation of Labor.

Non-manual employees were classified as exempt or non-exempt in accordance with the Fair Labor Standards Act of 1938. Non-manual employees were those employees who were not laborers or mechanics within the meaning of the Davis Bacon Act. Specifically, the term "non-manual employees" included all occupations not involving manual labor directly in connection with construction work. Custodial employees were classified as "non-manual employees".

The wages and salaries of the non-manual personnel were in accordance with classifications and rates approved by the War Department Wage Administration Agency and the Office of Chief of Engineers. The basic wage rates for all classifications of labor and mechanics were predetermined and issued from the Office of the Secretary of Labor on October 15, 1942, and revised on November 19, 1943, for work in the vicinity of the Clinton Engineer Works Project. Any additional rates or changes were obtained through the Office of Chief of Engineers by means of approval wage adjustments orders.

Up to January 20, 1944, fifteen Wage Adjustment Orders were issued by the War Department, Office of the Chief of Engineers, Construction Division.

2. Policies

(a) Timekeeping

All time on this Project was reported and figured in fifths of an hour. Tardiness due to personal reasons or transportation facilities was not generally excused. Tardiness of non-exempt weekly employees was excused, on occasions, by the Field Project Manager or his assistant, but this time was not included in building up the hours of work for overtime pay.

Time clocks were first placed in operation for the Field employees on March 28, 1943. Prior to that time, the daily service card served as a record of the hours worked. Time reported

on the service cards was copied on the weekly clock cards of each employee.

Starting June 14, 1943, all non-exempt salary roll employees working at or adjacent to the plant site were required to punch a time clock. One time clock was located in the administration building. Other time clocks were located in the temporary clock alleys.

(b) Payments

The weekly pay period for the project ended on Sundays. Employees were paid off on Friday of each week for the preceding period ending on the previous Sunday.

As many employees were handicapped financially, early checks were issued to those requiring funds. On June 22, 1943, the Control Department issued notice that no request for an early check would be honored by the Time Office on either Monday or Tuesday but that requests for early checks would be honored for payment after 4:30 P.M. on Wednesday but only with written approval of one of the four Superintendents and either the Field Project Manager or his assistant. No advances were made unless the employee worked at least three days in the current week that the cash advance was paid.

On June 26, 1943, an order issued by the Control Superintendent, advised that only laborers who had been recruited for this project would be granted cash advances. Exceptional cases were subject to review by the Craft Superintendent making the request and the Control Superintendent.

After November 25, 1943, cash advances were made only in unusually urgent cases.

Reporting time of two hours was allowed when the employee was sent home as he reported for work provided the employee clocked in and a service card had been properly filled out and approved by the Employee's foreman.

On several occasions, it was noted that employees arriving on the plant site during inclement weather failed to unload from the busses and returned to Knoxville without even clocking in. In some instances, the employee clocked in, but did not attempt to contact their immediate supervisor. No time was allowed nor were payments made to employees under such circumstances.

All non-exempt employees paid on a weekly basis were compensated for loss of time due to disability resulting from non-occupational causes provided the employee furnished a statement from his family physician or the Company physician stating that the employee was unable to work due to illness or injury.

Allowance of one day's pay for each month of continuous service was made up to a maximum of seven days. Total allowance

was not permitted to exceed five days in any one work week and in no case was any pay allowance made for absence occurring on the sixth day of a regular scheduled week.

Pay allowance for absence other than illness of both non-exempt and exempt employees required the approval of the Field Project Manager.

Disability wages paid on this project are shown on a tabular form on Page 189. Graphs entitled "Disability Wages" appears on Page 191 and 192.

Vacation wages paid on this Project are shown in tabular form on Page . A graph showing the monthly and accumulated vacation wages paid appears on Page 193.

3. Charts and Pertinent Data

Graphs entitled "Wages and Hours" showing average hourly pay rate, weekly payroll, accumulated payroll, accumulated paid premium hours, paid premium hours, hours worked and accumulated hours worked are included for the following groups:

Du Pont Company shown on Page 194; B. F. Shaw Company, Page 195; Broadway Maintenance Corporation, Page 196; LS and UP Subcontractors, Page 197; and a composite graph for du Pont and all Subcontractors appears on Page 198.

It is to be noted that the curves of Accumulated Payroll, Accumulated Paid Premium Hours and the Accumulated Hours Worked follow the shape of the well known "S" curves and represent the rate of actual progress towards construction completion. The "S" shaped curves also reflect the additions authorized and on which work was commenced on December 11, 1943.

From the curves entitled Wages and Hours, it is to be noted that the maximum weekly hours worked was reached during the months of August and September for all groups of employers with the exception of the LS and UP Subcontractors, who reached their maximum weekly hours worked during the month of June.

The curve, Premium Hours Paid, indicates work on holidays for which premium time was allowed. It also reflects the change in working hours from the eight hour day to the ten hour day which became effective during the week ending June 6, 1943, and which increased the premium time.

The curve of Accumulated Hours Worked also represents the physical completion progress of Projects 9733 and 58, and follows the "S" form which is so well known for this type of curve on construction projects.

On the composite curve of Wages and Hours for du Pont and all Subcontractors, a scale has been provided in order to obtain the physical percentage of completion of the Projects at various dates. This scale was obtained by the use of weighted percent-

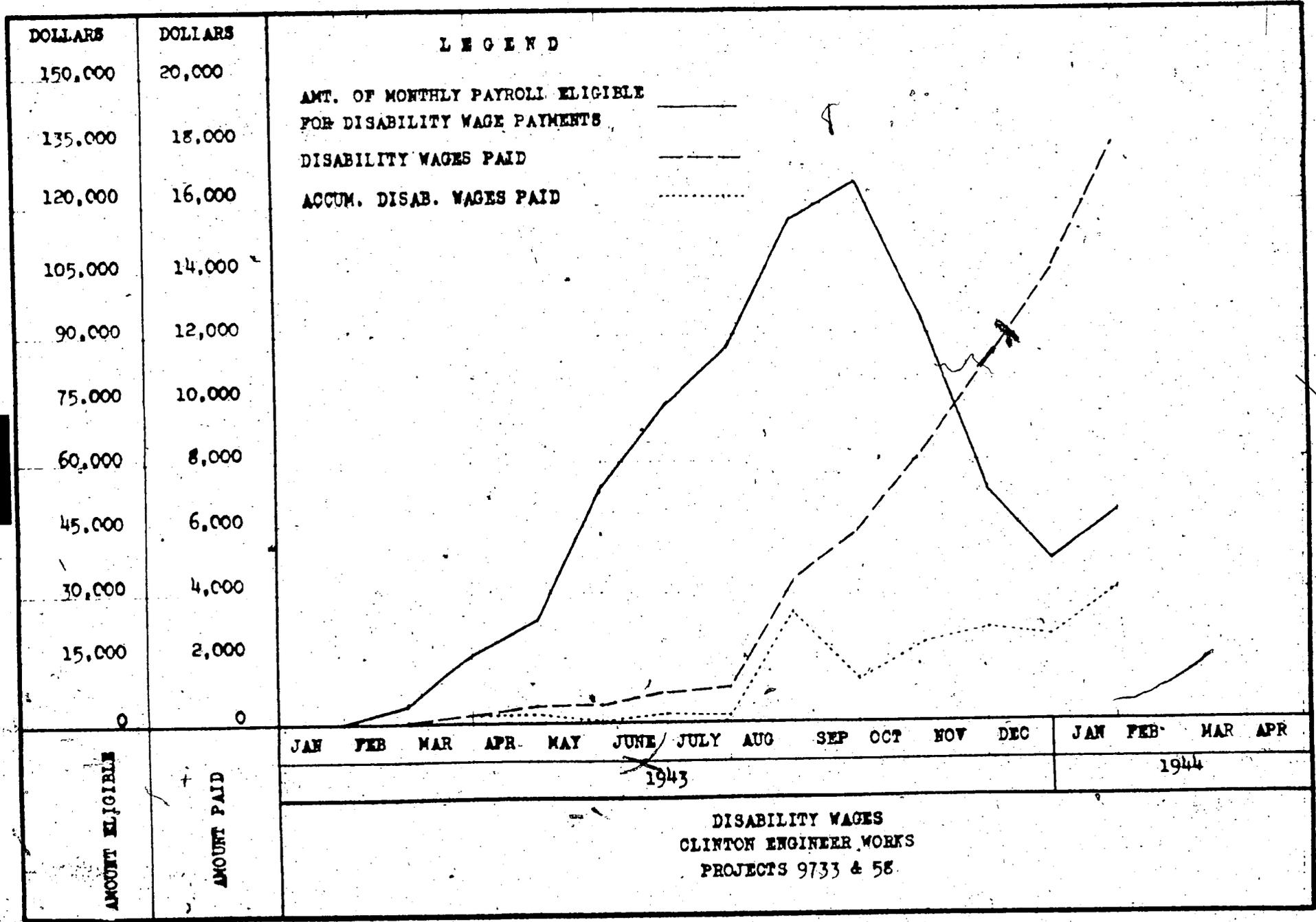
DISABILITY WAGES

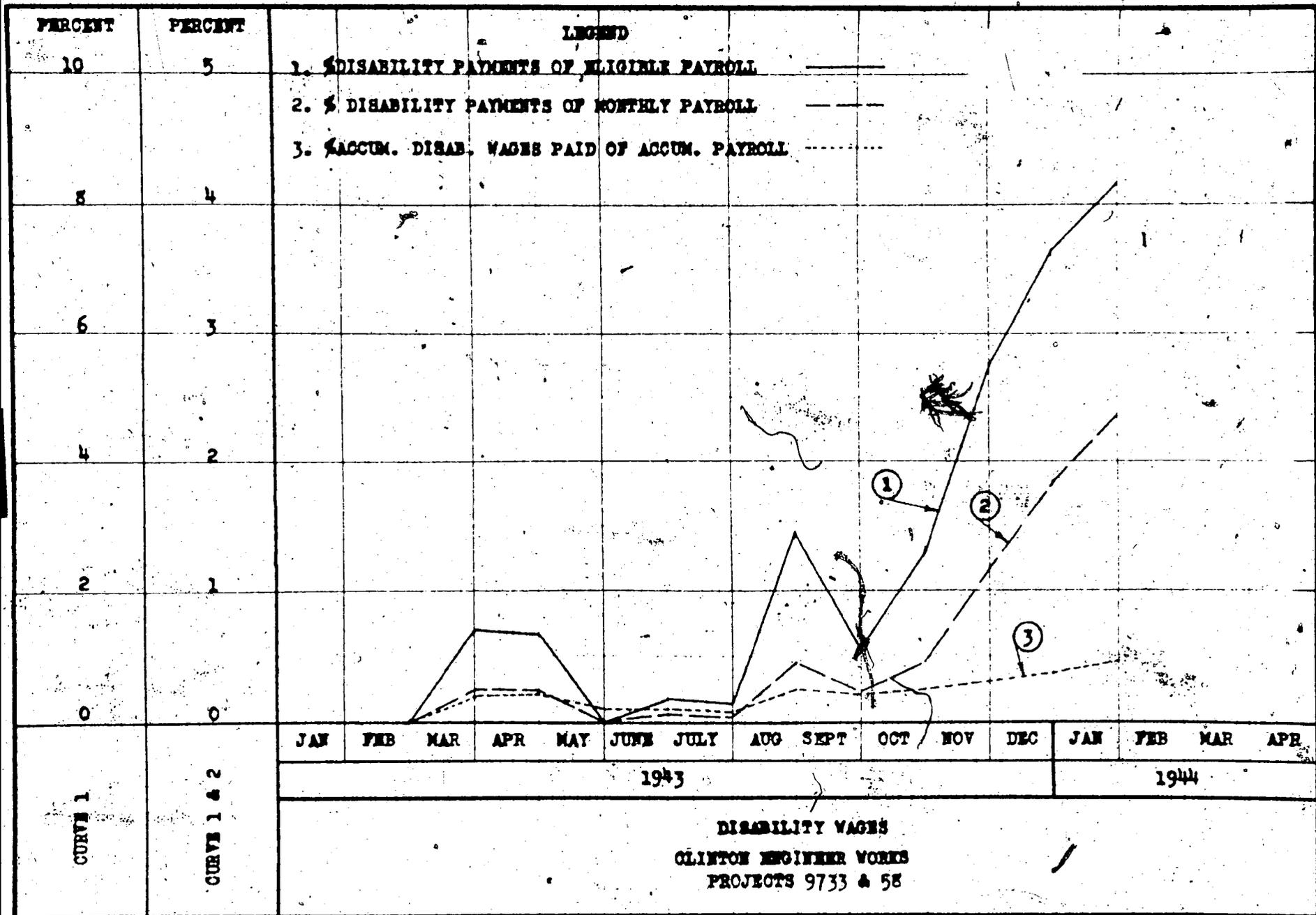
MONTH	AVER. FORCE	NO. ELIGIBLE	MONTHLY PAYROLL	ACCUMULATED PAYROLL	AMT. OF MONTHLY PAYROLL ELIGIBLE FOR DISABILITY WAGE PAYMENTS	DISAB. WAGES PAID	ACCUM. DISAB. WAGES PAID	% DISABILITY PAYMENTS OF ELIGIBLE PAYROLL	% DISABILITY PAYMENTS OF MONTHLY PAYROLL	% ACCUM. DISAB. WAGES PAID OF ACCUM. PAYROLL
FEB.	165	28	25167.73	26110.26	4270.89	0.00	0.00	0.0	0.0	0.0
MAR.	503	88	85498.17	111608.43	15462.78	220.00	220.00	1.422	0.257	0.197
APR.	795	140	136760.47	248368.90	24083.60	325.00	545.00	1.350	0.238	0.219
MAY	1059	185	277556.66	525925.56	53953.44	0.00	545.00	0.0	0.0	0.104
JUNE	1626	293	405637.73	950963.29	73091.86	340.00	885.00	0.384	0.084	0.095
JULY	1928	350	482161.09	1413124.38	87526.70	227.00	1112.00	0.260	0.047	0.079
AUG.	2426	378	740746.55	2153870.93	115415.72	3268.00	4380.00	2.830	0.442	0.238
SEPT.	1943	386	623853.84	2777724.77	123934.80	1380.17	5760.17	1.112	0.221	0.208
OCT.	1830	328	519830.19	3297554.96	93169.16	2420.66	8180.83	2.600	0.466	0.248
NOV.	1083	226	249955.82	3581324.15	52158.28	2878.81	11059.64	5.520	1.151	0.309
DEC.	749	190	146771.01	3728095.16	37231.40	2690.88	13750.52	7.220	1.835	0.369
JAN.	612	172	170932.78	3899027.94	48038.95	4015.78	17766.30	8.350	2.350	0.455

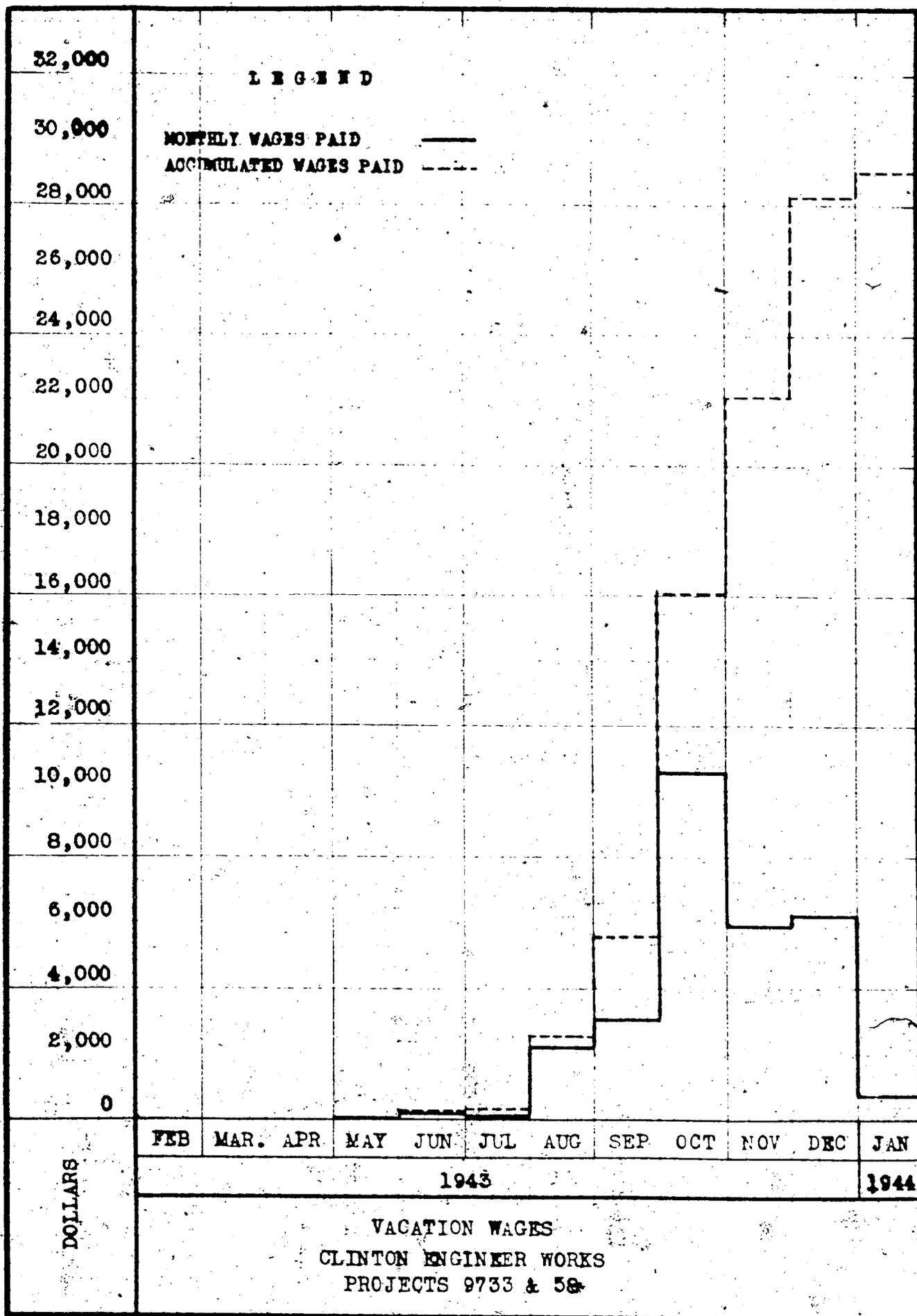
* ESTIMATED

VACATION PAGES

<u>MONTH</u>	<u>NUMBER EMPLOYEES ACTUALLY PAID</u>	<u>AMOUNT</u>
FEBRUARY	0	0.00
MARCH	0	0.00
APRIL	0	0.00
MAY	1	46.00
JUNE	1	190.00
JULY	1	65.00
AUGUST	21	2213.40
SEPTEMBER	21	3072.07
OCTOBER	77	10556.43
NOVEMBER	50	5994.30
DECEMBER	40	6178.24
JANUARY	9	782.85

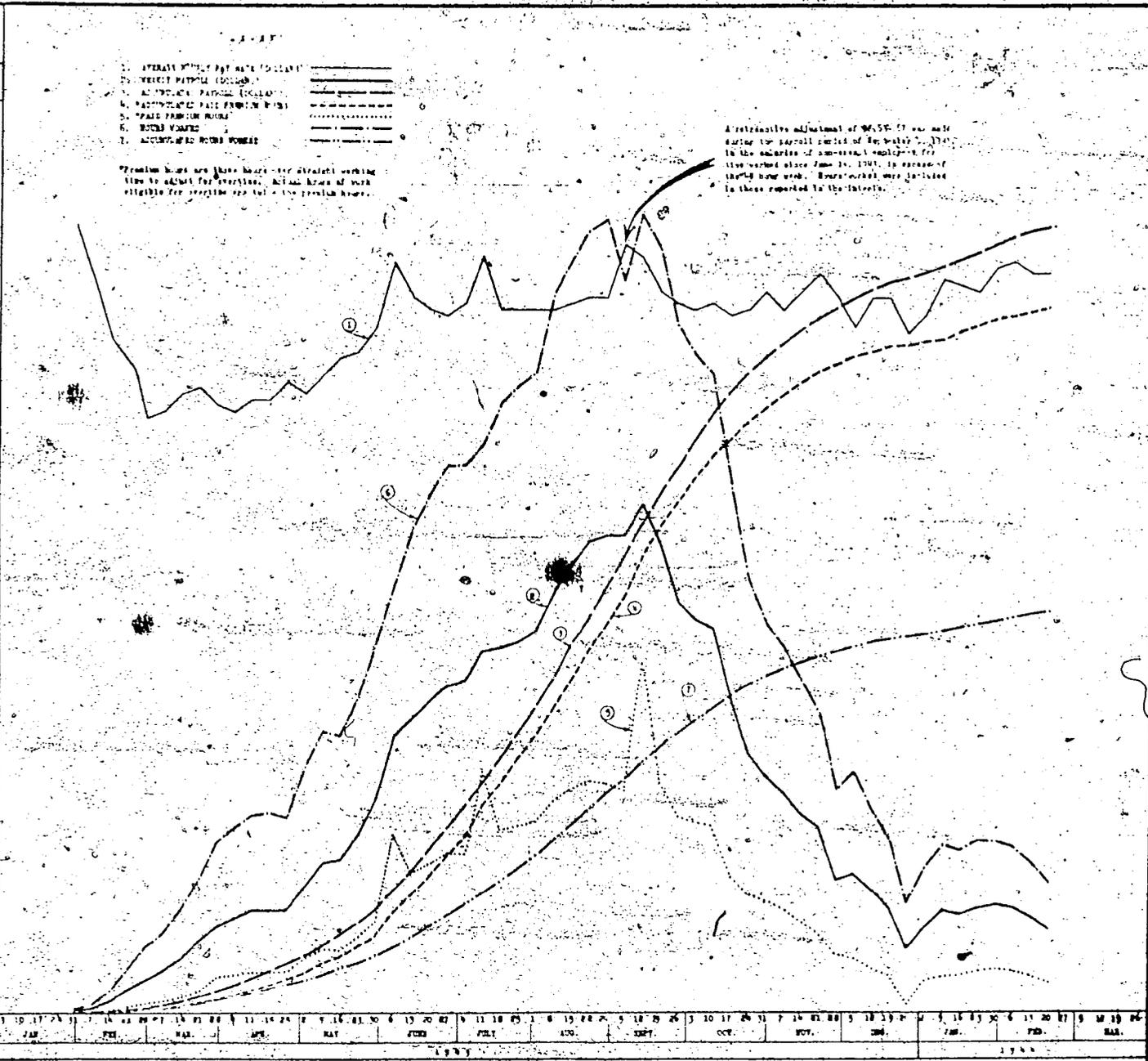






VACATION WAGES
 CLINTON ENGINEER WORKS
 PROJECTS 9733 & 58

MONTH	HOURS			DOLLARS		DOLLARS
	1957	1958	1959	1957	1958	
JAN	150	15	60	1,900	375	1.30
FEB	140	10	50	1,700	270	1.40
MAR	130	15	50	1,500	260	1.30
APR	140	10	40	1,600	260	1.40
MAY	110	55	40	1,300	280	1.10
JUN	100	10	40	1,000	200	1.00
JUL	90	15	30	1,700	180	1.30
AUG	80	20	10	1,400	160	1.20
SEP	70	15	10	1,100	140	1.10
OCT	60	10	10	1,000	120	1.00
NOV	50	10	10	1,200	100	1.20
DEC	40	10	10	1,000	100	1.00
TOTAL	1,200	150	500	15,000	2,000	1.25

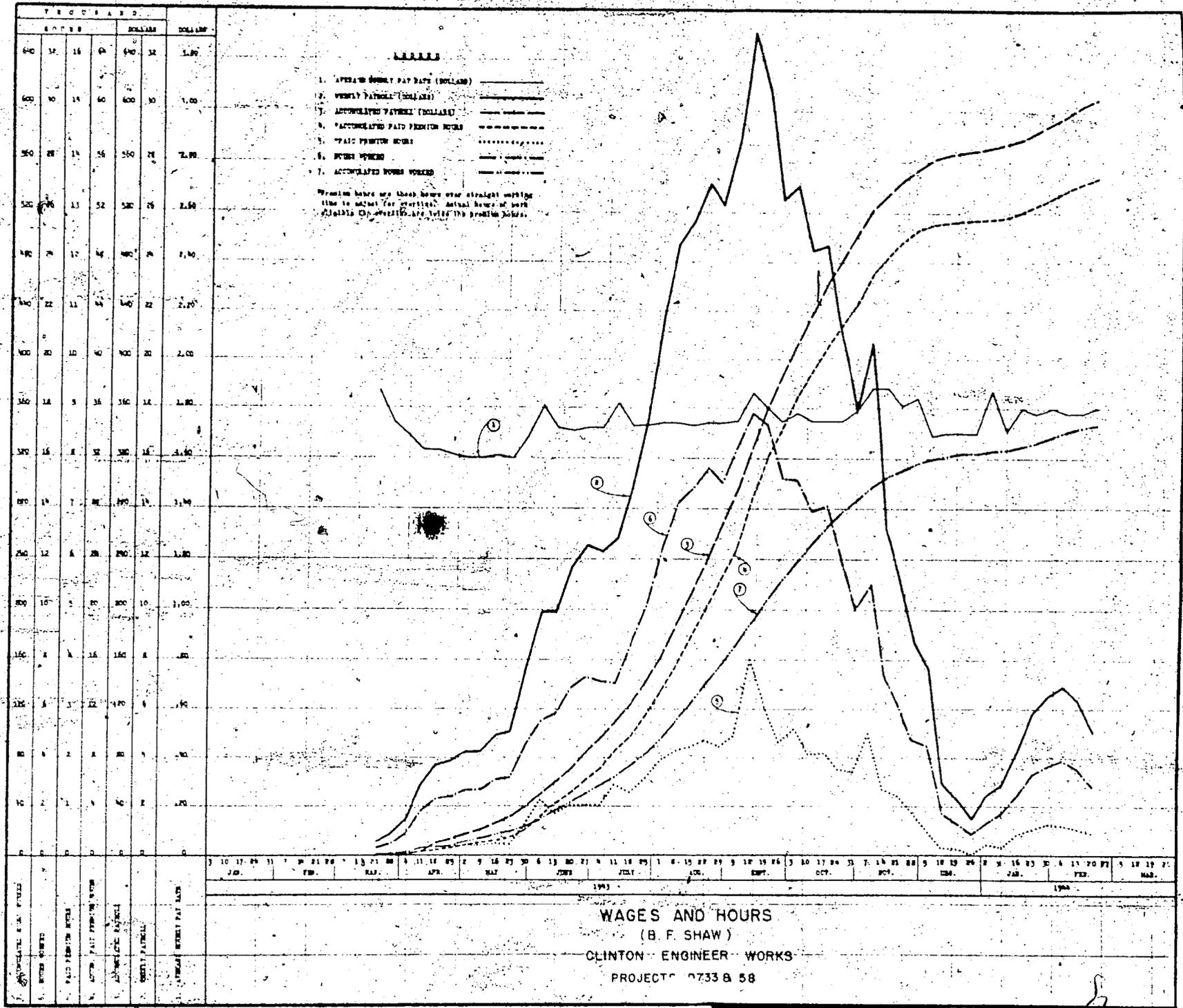


1. OVERALL MAN-HOUR RATE (DOLLARS)
2. DIRECT PAYROLL (DOLLARS)
3. INDIRECT PAYROLL (DOLLARS)
4. ACCUMULATED PAID PREMIUM HOURS
5. PAID PREMIUM HOURS
6. TOTAL HOURS
7. ACCUMULATED HOURS FORWARD

*Premium hours are those hours for overtime working time in excess of 40 hours. Actual hours of work eligible for overtime are not the premium hours.

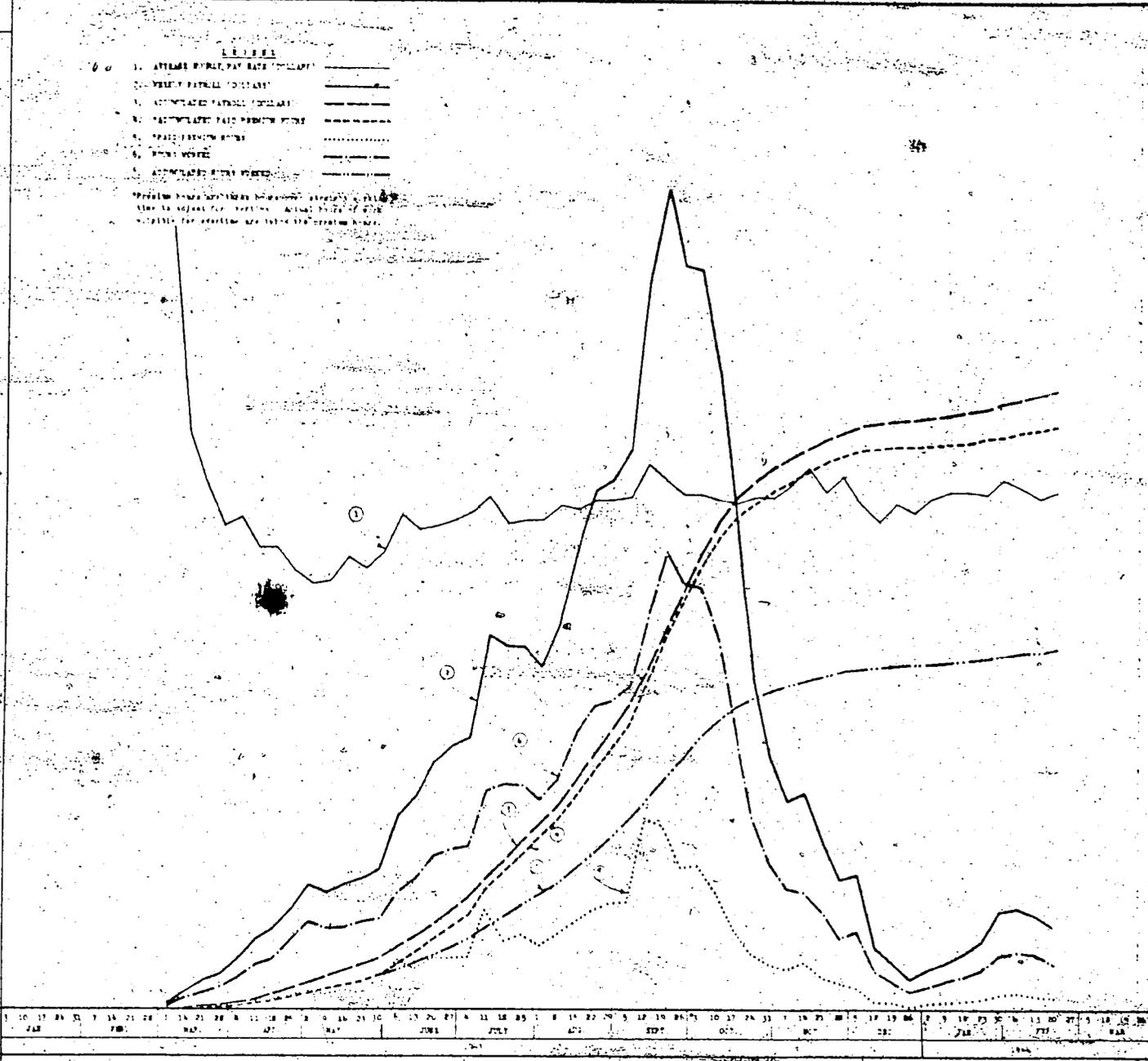
A retrospective adjustment of \$0.55 per hour during the payroll period of February 1, 1958, to the salaries of non-union employees for the period since June 1, 1957, in excess of the 40 hour week. Hours worked were included in those reported for the interval.

WAGES AND HOURS
(DU PONT)
CLINTON ENGINEER WORKS
PROJECTS 9733 & 68



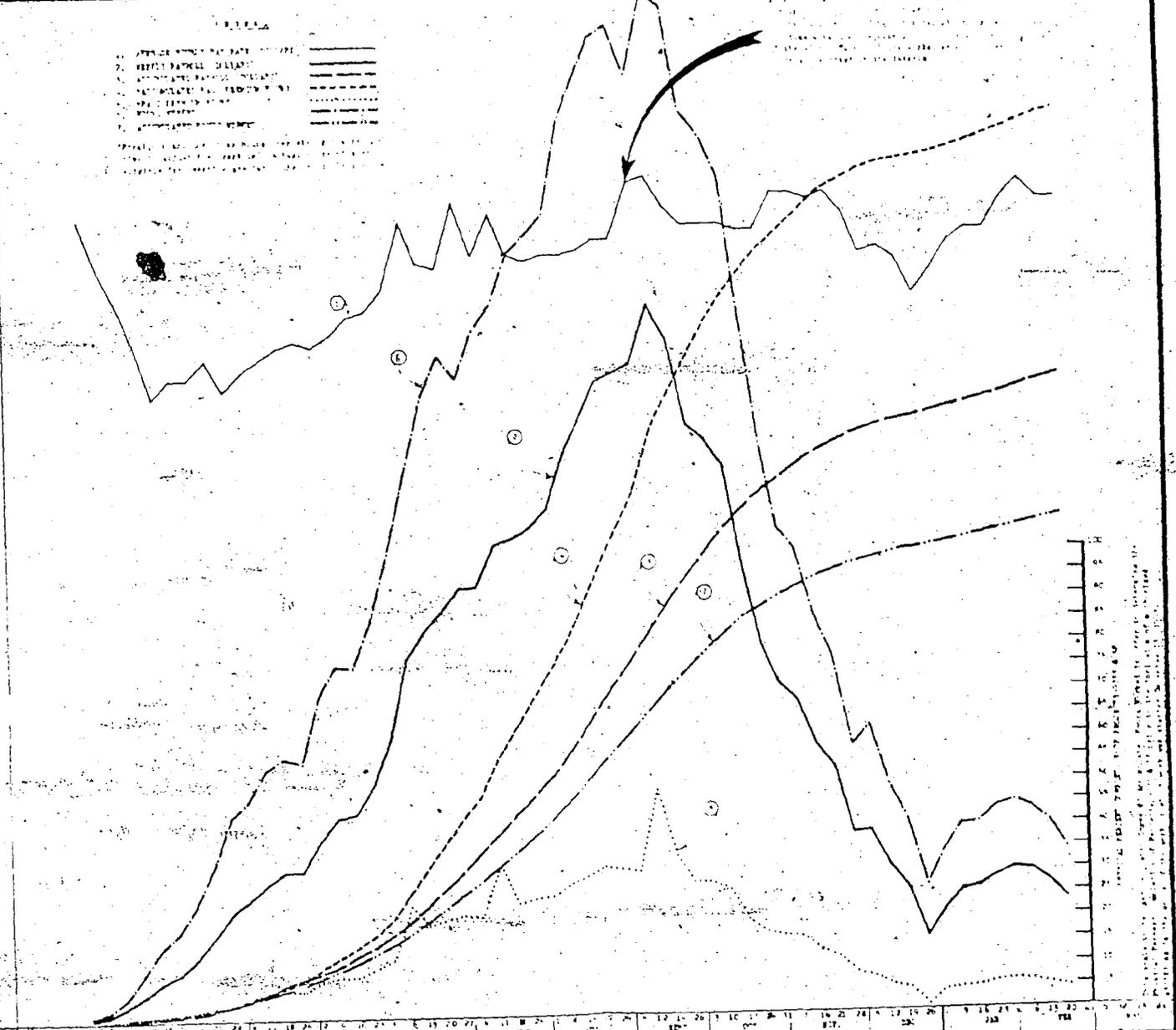
WAGES AND HOURS
 (B. F. SHAW)
 CLINTON ENGINEER WORKS
 PROJECT 0733 & 58

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	DOLLARS
1	140	12	12	5	10	12	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
2	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
3	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
4	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
5	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
6	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
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8	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
9	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
10	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
11	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
12	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
13	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
14	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
15	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
16	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
17	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
18	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
19	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
20	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
21	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
22	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
23	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
24	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
25	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
26	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
27	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
28	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
29	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
30	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	
31	160	10	15	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1.00	



WAGES AND HOURS
 (BROADWAY MAINTENANCE CORP.)
 CLINTON ENGINEER WORKS
 PROJECT 9733 & 58

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
1952	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
1953	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
1954	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
1955	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
1956	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1957	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1958	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1959	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1960	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1961	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1962	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1963	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1964	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1965	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1966	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1967	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1968	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1969	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1970	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100



WAGES AND HOURS
 (DU PONT AND ALL SUBCONTRACTORS)
 CLINTON ENGINEER WORKS
 PROJECTS 9733 & 58

ages for the various construction items which enter into the calculation of the physical percent completion of the projects. The percent completion of the projects was determined as 97.0% as of November 30, 1943. The scale was based on the projects on which construction was nearing completion at that time and prior to the commencement of the construction on authorized additions which began on December 15, 1943.

The curves shown on the Wages and Hours charts also reflect the work done on the additional authorized construction. The effect first became noticeable during the week ending January 2, 1944, at which time the various curves reversed the normal trends.

A discussion of the rate or speed of construction is covered under a section of this history entitled "Progress of Construction" wherein the curve of Accumulated Hours worked was interpolated to obtain the physical percent completion of Projects 9733 and 58 for the various periods.

The tabulation shown on Page 200 indicates the various wages paid and the hours worked. It is to be noted that the wages paid employees of the du Pont Company averaged \$1.18 per hour, including overtime payments. The average hourly pay rate for straight time was \$1.03. The du Pont Company, due to the overtime work of its employees, obtained a 28.2% equivalent increase in manpower over that available if the work week was maintained at forty hours per week.

The B. F. Shaw Company, Cost-Plus-A-Fixed-Fee Subcontractor, having a contract for the piping work on these projects, paid an average hourly rate of \$1.76 per hour which included overtime payments. The average hourly rate on the basis of straight time was \$1.52. The Company obtained through overtime work, an increase of manpower of 31.6% over that which was available if they had worked their employees only forty hours per week.

The Broadway Maintenance Corporation, Cost-Plus-A-Fixed-Fee Subcontractor, having a contract for the electrical work on these projects, paid an average hourly rate of \$1.71 per hour which included overtime payments. The average hourly rate for straight time was \$1.47. This company obtained an increase in its manpower of 32.2% due to working its employees over the normal pre-war forty hour week.

The ~~IS~~ and UP Subcontractors taken as a group and doing various types of work paid an average hourly rate, including overtime, of \$1.28 per hour. The average rate based on straight time was \$1.07 per hour. A 27.5% equivalent increase in manpower was obtained from this group of employees due to the overtime work.

Considering the employees of all the contractors on these projects, the average hourly rate of pay was \$1.26 per hour including overtime adjustments. The average rate of pay for straight time was \$1.10 per hour. The projects as a whole gained an equivalent of 28.6% in manpower due to overtime work. The urgency of

CLINTON ENGINEER WORKS
WAGES AND HOURS
PROJECTS 9733 & 58

TYPE OF CONTRACT	COST PLUS FIXED FEE			LS & UP SUBCON- TRACTORS	DU PONT AND ALL SUBCON- TRACTORS
	PRIME	SUBCONTRACT			
COMPANY	DU PONT COMPANY	B. F. SHAW COMPANY	BROADWAY MAINT- TENANCE CORP.		
TYPE OF WORK	GENERAL	PIPE	ELECTRIC	MISCELLANEOUS	ALL
Maximum Average Hourly Pay Rate, including overtime.	\$ 1.33	\$ 1.87	\$ 2.63	\$ 2.13	\$ 1.39
Minimum Average Hourly Pay Rate, including overtime	\$ 1.01	\$ 1.60	\$ 1.44	\$ 0.79	\$ 1.03
Average Hourly Pay Rate, including overtime	\$ 1.18	\$ 1.76	\$ 1.71	\$ 1.22	\$ 1.26
Average Hourly Pay Rate, adjusted to straight time	\$ 1.03	\$ 1.52	\$ 1.47	\$ 1.07	\$ 1.10
Maximum Weekly Payroll	\$ 172,543.99	\$ 33,118.49	\$ 27,629.95	\$ 12,430.96	\$ 235,599.33
Accumulated Payroll	\$ 3,994,898.85	\$ 609,686.34	\$ 417,529.84	\$ 236,498.85	\$ 5,258,613.88
Maximum Weekly Hours actually worked	134,950.50	17,784.40	15,465.60	10,105.00	169,813.50
Maximum Weekly Paid Premium Hours	29,541.40	4,000.70	3,159.80	1,470.20	35,517.25
Accumulated Hours Actually Worked	3,391,104.90	346,994.70	244,861.10	193,976.00	4,176,936.70
Accumulated Paid Premium Hours	478,053.70	54,838.90	39,369.22	26,658.80	598,920.62
Accumulated Pay Hours	3,869,158.60	401,833.60	284,230.32	220,634.80	4,775,857.32
Accumulated hours Subject to Overtime Pay	956,107.40	109,677.80	78,738.44	53,317.60	1,197,841.24
Percent Overtime Hours of Hours Actually Worked	28.2	31.6	32.2	27.5	28.6

Note: Based on data accumulated from
start of Project through
February 20, 1944.

[REDACTED]

the completion of these projects and the available manpower situation required the large amount of overtime worked on these projects.

It is to be noted that the employees of the du Pont Company worked approximately 81.2% of the total hours worked by all the contractors on these projects. The B. F. Shaw Company worked approximately 8.3%, the Broadway Maintenance Corporation approximately 5.9% and the LS and UP Subcontractors accounted for approximately 4.6%.

A saving of 18 cents per hour on the average wages paid could have been made if the project had operated on a forty-hour week. It is estimated that the actual additional cost of the overtime worked on these Projects was approximately \$700,000 which is approximately 13% of labor costs involved in the construction of the projects.

I Material

1. Procurement

Permanent plant equipment, major construction equipment, tools, general building materials, and other pertinent materials and equipment necessary for the construction of Projects 9733 & 58 at Clinton Engineer Works were procured through the following sources: (a) Wilmington Purchasing Department, (b) Field Purchasing Department, and (c) the U. S. Government.

(a) Wilmington Purchasing Department

Wilmington Orders (half-numbers) for major items of permanent plant equipment originated in the Design Division in the Wilmington Office. The Design Division prepared drawings, specifications, etc., and secured quotations through the Wilmington Purchasing Department. Upon receipt of quotations and the assignment by the field of a half-number, a Purchase Requisition was written, approved, and forwarded to the field where it was used as a guide in the execution of the formal purchase order. Approval by the local Area Engineer was waived as these orders had had the prior approval of Major Sapper, Manhattan District Corps of Engineers, before the request for a half number assignment for the purchase order was sent to the Field.

A total of 1302 half-number purchase orders, having an approximate accumulative valuation of \$1,874,688, was placed for Project 9733 up to and including March 15, 1944. The first half-number purchase order, RFG 1½, was placed on January 22, 1943, with the Bird Machine Company for four 40" stainless steel centrifuges. In so far as possible, items having the largest delivery time were ordered first. The first 100 half-number orders placed were composed of the following: instruments, stainless steel tubing and plate structural steel, Filter Plant and Boiler House equipment, fabricated stainless steel equipment, pumps, fans, etc. Half-number purchase orders were also issued to cover all contracts negotiated and awarded by the Wilmington Contract Section, including Unit Price and Lump Sum Contracts.

Approximately 125 RFG half-number purchase orders covering items common to both CEW & AEW were placed by the Wilmington Purchasing Department, in the group RFG 1½ through 801½ and starting again with 802½. The first combined orders were placed on November 19, 1943, for a quantity of 25-12 OB stainless steel plates in order to provide vendors with stock material for the fabrication of orders which were to follow in connection with these projects. The majority of these orders were for stainless steel plate and tubing and, in most cases, were shipped directly to vendors for fabrication on our orders. Of the total half-number purchase orders for Project 9733, fifteen were special orders and were restricted for plant security. The purchase orders written to cover the labor costs of machining and canning metal slugs were included in this group. The preparation and handling of papers for these orders

were limited and only designated personnel were included in the routing of such correspondence.

The placing of half-number purchase orders for Project 58 began on July 9, 1943, when XPO 1001 was placed with Bethlehem Steel Company for miscellaneous steel plates and shapes. A total of 142 half-number purchase orders, amounting to approximately \$130,000, was placed up to and including March 15, 1944.

(b) Field Purchasing Department

Field orders (whole numbers) for items of general building materials, major construction equipment, tools, and other pertinent materials and equipment necessary for construction originated in the Field and were procured by the local Purchasing Department. Whole-number purchase orders were also issued to cover contracts negotiated and awarded by the local Contract Department, including Cost-Plus-A-Fixed-Fee, Unit Price, and Lump Sum Contracts. The cost of the services of erection supervisors, not included in the original cost of the whole and half-number purchase orders, was usually covered by issuing a whole-number purchase order.

Requisitions were originated in most cases by the Craft Superintendents, but in some cases by Division Engineers and Department Heads. Record of Purchase in duplicate was prepared in all cases where additional approval of the Field Project Manager and/or the Area Engineer was required unless the order was over \$5000 or involved labor, in which case it was in triplicate. Quotations were mandatory on all orders which required prior government approval for placing. Quotations were also obtained where possible on orders amounting to \$2000 or less (where no Record of Purchase is involved) and a quotation was required from the successful bidder on orders in this category over \$100.

A total of 2195 whole-number purchase orders, for Project 9735 amounting to approximately \$1,090,401.63, was placed by the Construction Purchasing Department up to and including March 15, 1944. The first XPO whole-number purchase order was issued on January 19, 1943, for miscellaneous stationery supplies in order to set up field offices.

Whole-number purchase orders totaling 105, in the amount of approximately \$8,382.84, were placed for Project 58 beginning on May 21, 1943, with XPO 5001. The majority of these orders were issued for special machine shop work performed by shops in Knoxville and vicinity.

(c) U. S. Government

(1) Government Purchases

The government, in order to aid in the procurement of critical materials and special services, directly negotiated contracts with

companies for furnishing the prime contractors at Clinton Engineer Works with ready-mixed concrete, crushed stone, gasoline and oils, tires and tubes, telephone and telegraph services, core drilling, etc. The Area Engineer's office was furnished with du Pont's daily requirements for stone, concrete, gasoline and oil. Government vouchers were currently issued by the Government Accounting Department by which the Cost Department was able to debit construction cost codes and to credit Direct Government Payments for material received from these sources.

(2) Material Furnished by the Government

130 tons of rare metal used in charging the 105 Building, valued at approximately \$4,000,000, were furnished by the United States Government. This material was shipped by the Government as requested by du Pont to Baker Bros., Inc., Toledo, Ohio, where it was cut and machined into pieces 1.10" in diameter x 4" long. This work was performed on du Pont's Purchase Order Number XPO 588½. From there it was shipped to New Kensington, Penn., where it was processed (known as canning) by the Aluminum Company of America prior to shipment to the plant site. This processing was performed on du Pont's Purchase Order Numbers 425½ and 1628½. This material was carefully guarded from the time it was turned over by the Government until the time it reached the plant site. Each metal slug was tested in the 105-B Carborizer Building, temporarily constructed on the plant site for this purpose, prior to final charging in the 105 Building. Test work began on June 26, 1943, and all slugs failing these tests were returned to the Aluminum Company of America at New Kensington, Penn., for recanning and were again tested prior to installation. The number failing this second test again was again sent to the above address for further processing. The last shipment of recanned slugs was received on the plant site on March 11, 1944.

(3) Government Transfers

The Excess Material Department was set up on January 27, 1943, and was primarily established to obtain major construction equipment, general building materials, office furniture, and equipment, and shop and small tools required by the construction forces. Under the regulations set up by the War Department and the War Relocation Board, all War Construction Projects were required to obtain as much as possible of the above list of items from other government projects in order to make the greatest use of government-owned equipment and material as well as to release the production facilities of manufacturers and producers. This department also endeavored to find an immediate source of supply for critical items for which the Wilmington Purchasing Department and the Field Purchasing Department were unable to obtain satisfactory promise delivery dates from vendors.

Excess Material requests were made both by the Allocation Engineer in Wilmington and the Excess Material Department in the Field. The requests made by the Wilmington Office were designated as ET letters and were usually for the transfer of excess material and equipment from another du Pont War Construction

Project. The RT letter numbers issued for transfer of material for this project were not in consecutive order. A total of 119 RT letters, amounting to approximately \$84,279.47, was issued for this project. Of this total, partial or complete shipments were received on approximately 95% of these requests.

Requests for transfer of government material and equipment by the Field were designated as LR letters and were numbered in consecutive order. A total of 489 Letters of Request were issued by the Field Excess Material Department, amounting to approximately \$979,559.90. Three of these were Special Letters of Request numbering from 1001 to 1003, inclusive. Requests as to the availability of government excess material and equipment were normally made by the Draft Superintendents, Division Engineers, Purchasing Department, and Department Heads.

On February 1, 1943, the Excess Material Engineer was provided with a list of major construction equipment and small tools, and office furniture and equipment necessary for setting up construction. From time to time, these lists were currently revised upon release of design and change in scope of the work. On several occasions, Field trips were made by the Excess Material Engineer to various government construction projects and ordnance depots referred to the Company by the Area Engineer as a possible source of critical construction equipment and building materials. All requests made by the Field for government transfers were made through the Procurement Section of the Area Engineer's office. The list of major construction equipment transferred to this project is included under "Part V, Section J - Major Construction Equipment".

Considerable delay was encountered in the procurement by government transfer of major construction equipment and shop tools, as the Procurement Section up to this time had been unable to fulfill requirements of other prime contractors previously established at Clinton Engineer Works. Whenever possible critical items of major construction equipment were loaned to the Company by the Stone & Webster Engineering Corporation at the request of the Area Engineer until these items could be obtained from Excess Sources. Critical items of building material and small tools were likewise loaned and transferred from one prime contractor to another. Blanket authorizations for the transfer of government-owned materials to this project were obtained by the Area Engineer during the mid-point of construction. Under this setup, shipments could be made immediately upon verbal request from the local Procurement Section. This was only true for building materials and small tools, all transfers for major construction equipment had to be cleared through the Chief of Engineer's Office in Washington.

8. General Building Materials

A tabular list showing the approximate quantities and unit prices of general building materials that were procured through

Government Purchases, du Pont Purchases, and Government Transfers for the construction of Projects 9733 and 58 at Clinton Engineer Works is included in this section and will be referred to from time to time in giving a brief description of quality of material used.

(a) Concrete

A total of approximately 25,802 cubic yards of Class A Concrete was procured through the government from the Transit-Mix Corporation. Of this total, approximately 95% was of the following mix: 8½ bags of Portland Cement to 1375 pounds of sand and 1956 pounds of medium gravel passing a 1½" sieve. Approximately 5% was a rich mix consisting of 7 bags of Portland Cement to the same amount of sand and gravel, designed to assure an early high strength. The latter was used mostly in floor slabs where slower setting would have delayed other work in the building. The difference in cost between the regular mix and the rich mix was 60¢ for each additional bag of cement used, which increased the cost from \$7.35 for regular mix concrete to \$5.25 per cubic yard for rich mix concrete. The above prices provided for delivery of unmixed concrete into government-owned mixer trucks at the site of the concrete mix plant. An additional 70¢ per cubic yard was added for all concrete delivered by the Transit-Mix Corporation to the plant site. Approximately 190 cubic yards of the rich mix concrete was batched from small aggregate concrete, passing a 3/4" sieve. Small aggregate concrete was used in the walls and roof slabs of test tanks in Building 706-C. Of approximately 2% of the total yardage poured, "Hi-Early" Cement was used. The concrete mixer trucks were loaded at the central mixing plant with aggregate and sand. The "Hi-Early" Cement was added by du Pont at the plant site. This was used in concrete roof slabs for Buildings 105, 706-A, and 706-B to speed up construction work.

In addition to the total yardage of Class A Concrete poured, 118 cubic yards of Class B Special Concrete were batched separately by du Pont on the plant site for the 105 Building. The mix consisted of 1858 pounds of low-heat Portland Cement to 1779 pounds of Haydite Sand and 3017 pounds of Barytes Aggregate, using 61 gallons of water. Chemical analysis of Barytes Aggregate was 96.4% Barium Sulphate.

(b) Crushed Stone

A total of 79,950 tons of crushed limestone was procured for roads, walks, and whenever crushing was required. Of this total approximately 66,100 tons were procured through the government from the Ralph Rogers Quarry located on the plant site at a cost of \$1.39 per ton, including delivery. 1300 tons were procured by du Pont from Cameron Brothers at a cost of \$1.76 per ton including delivery and 650 tons were procured from the Frank D. Underwood Quarry at a cost of \$1.30 per ton at the quarry site. The stone received from the latter two quarries was mainly limestone

and fast, while the majority of the stone procured from the Ralph Rogers Quarry was size #3 (from 1½" to 2".)

(b) Lumber

Structural frame lumber, sheeting, decking, siding, and flooring, totaling 5,387,896 board feet, were procured at an average unit cost of \$58.93 per thousand. All structural lumber was Class 1 dense yellow pine and fir, having a fibre stress of at least 1200 pounds per square inch. All other lumber was Class 2, having a fibre stress of at least 900 pounds per square inch. The lumber used in all permanent building structures was 843, a small percentage of which was treated with zinc chloride.

(c) Steel

346 tons of reinforcing steel costing approximately \$4.80 per Cwt. was used, varying in size from ½" round to 1" round and 1" square to 1½" square. Approximately 130,000 square feet No. 9 and No. 11 standard metal Steelcrete reinforcing was also used for floor slabs. 375 tons of fabricated structural steel framing for Buildings 105, 301, 307 were purchased from the Virginia Bridge Company at an average cost of \$122.00 per ton. This included furnishing of materials, fabrication, and delivery to the nearest rail siding. All structural steel was painted with one coat of red lead primer by the vendor. Miscellaneous structural steel shapes, amounting to approximately 200 tons, were procured by du Pont Purchase and Government Transfer.

(d) Special Siding and Roofing

28,800 square feet of corrugated asbestos "Transite" siding and roofing, costing 10¢ per square foot, was purchased for covering the 301 Boiler House Building. Roofing and siding were erected in 48" x 18" sheets fastened to wooden girts with galvanized drive screws. Approximately 15,000 square feet of 18 and 22 gauge V-Beam Robertson protected metal roofing, costing approximately 80¢ per square foot was purchased for the roof of the 105 Building, and was fastened to the steel framework by means of galvanized bolts and clips. 24 gauge RPM flashing was used at the eaves, ridges, and gables where the top of lean-to roofs joined with the "Q" siding panels. 24,800 square feet of Robertson patented "Q" panel, costing approximately 70¢ per square foot, was purchased for exterior wall siding of the 105 Building. The "Q" panel siding consisted of 18 gauge black steel fluted Q-unit plus 1" commercial fibre board insulation, plus 18 gauge black steel vapor barrier assembled into one section for field erection. Panels were finished with one shop prime coat of black paint. These panels were fastened to wooden girts by lag screws and to steel girts by bolts and clips.

(e) Lining and Ceiling Materials

The following types and quantities of building linings were

procured: approximately 60,000 square feet of 3/8" gypsum board, costing approximately \$32.78 per thousand square feet; 230,000 square feet 1/2" asbestos rock board 4' x 8' sheets, costing approximately \$70 per thousand square feet; 22,290 square feet 3/4" pressed wood (Masonite), costing \$82 per thousand square feet; and 25,000 square feet 2" x 4" rock wool and balsam wool batting, costing \$55 per thousand square feet.

3. Material Control and C.M.P.

(a) Material Control

In order for du Pont to attain the earliest possible start-up and completion date for Projects 8733 and 58, it was mandatory that a close control of material be maintained for these projects and that a system be set up to give a high degree of control with current information on the latest promise delivery dates for both half and whole-number purchase orders. To accomplish this control, a definite procedure was established at the outset of the job before any construction work started.

The first control work originated in the Principal Control Engineer Section, Construction Division, in the Wilmington Office when a Control Engineer was set up in that office to follow the requisitioning and placing of half-number purchase orders and acted as a coordinator for information pertaining to design, purchasing, expediting, priorities, and inspection. On February 24, 1943, a similar control organization was set up in the Field at Seabrook School.

Material Control at Clinton Engineer Works was hampered by a centralized organization as the project was not large enough and there were not enough orders of material involved to justify the setting up of a separate organization for each area. The Field Material Control Department was greatly handicapped for several months due to its distance from the plant site and the Knoxville Office and the lack of telephone facilities vital to the proper functioning of this department. For the first six weeks, a representative of this department contacted the Field daily at the noon-day meeting held in the Field Superintendent's office and he advised the field group of the latest developments and promise delivery dates for whole and half-numbers purchase orders requested at the previous meeting.

The Material Control and C.M.P. Department were combined on April 5, 1943, to eliminate considerable overlapping of work performed by separate organizations. It was not until the Material Control Office had been moved to the plant site that this department could render the type of service required. A Visible Kardex Record System was employed by this department to keep an up-to-the-minute record of each record of each half and whole-number purchase order. The Material Control posted daily new orders placed, new promise dates, shipping dates, dates material re-

**CLINTON ENGINEER WORKS
PROJECTS 9733 & 38
SUMMARY GENERAL BUILDING MATERIALS**

<u>ITEMS</u>	<u>GOVT. PURCH.</u>	<u>DU PONT PURCH.</u>	<u>GOVT. TRANS.</u>	<u>UNIT PRICE</u>
<u>Concrete</u>	25,000 Cu. Yds.			\$ 7.35 per cu. yd.
Cement		2,552 bbls. 1,658 bags		2.50 per bbl. .65 per 95# bag
Raydite Sand		875 tons		6.25 per ton
Barytes Aggregate		1,306 tons		7.25 per ton
<u>Stone #3</u>	**66,100 tons	**13,000 tons *** 650 tons		*1.39 per ton **1.70 per ton ***1.30 per ton
<u>Lumber</u>		3,977,573 bd. ft.	1,410,323 bd. ft.	58.93 per bd. ft.
<u>Steel</u>				
Reinforcing Steel		300 tons	130 tons	4.80 per Cwt.
Structural Steel		375 tons		122.00 per ton
Miss. Shapes		100 tons	100 tons	4.08 per Cwt.
<u>Special Siding & Roofing</u>				
Transite		28,600 sq. ft.		.10 per sq. ft.
V-Beam ACM Roofing		15,000 sq. ft.		.50 per sq. ft.
Q-Siding		24,800 sq. ft.		.70 per sq. ft.
Roll Roofing		1,983 rolls		1.95 per roll
<u>Lining and Ceiling Materials</u>				

Gypsum Board		60,000 sq. ft.		32.75 per M sq. ft.
Rock Board		230,000 sq. ft.		70.00 per M sq. ft.
Masonite		22,290 sq. ft.		82.00 per M sq. ft.
Plywood		40,000 sq. ft.	20,000 sq. ft.	129.00 per M sq. ft.
Insulation - R12		25,000 sq. ft.		55.00 per M sq. ft.
Paint		4,500 gals		2.00 per gal.
Nails		1,716 kegs	152 kegs	4.35 per keg
Barb Wire		8,000 Rods		.0500 per rod
Power Poles		90	200	19.00 @
Pipe Supports			420	15.00 @
<u>Miscellaneous</u>				
Tires	1,004			25.25 @
Tubes	877	6		2.98 @
Gas	218,721 gals.			.17 per gal.
Oil	18,160 gals.			.28 per gal.

ceived on the plant site, and other pertinent information. Take-offs for building materials and equipment were made by this department against quantities of materials shown on drawings against field requisitions, thus eliminating the chance of either department overlooking the ordering of required items of building material and equipment.

(b) Controlled Materials Plan

The Controlled Material Plan controlled the deliveries of steel, copper and aluminum that was required for use in construction and fabrication of equipment needed on these projects. Allotments for these materials had to be obtained from the War Production Board in Washington, D. C. In the case of Class BI and BII products, it was not necessary for the du Pont Company to make application for an allotment of controlled materials used in the fabrication of these products as this request is made by the fabricator through the Industry Division, but in the case of Class A products it was necessary for the du Pont Company to make application for the controlled materials required. This application was made by the CMP Section in Wilmington to the Corps of Engineers also located in Wilmington who were our Claimant Agency, they, in turn, passed the information to the WFB. Information as to the amounts of controlled materials was furnished to the CMP Section by the Design Division. This information also included the requirements that would be needed by the field on whole-number orders as they were in a better position to determine what materials would be required before this information could be made available to the field.

The CMP Section in Wilmington kept the accounts on all allotments of controlled materials granted to this project and also of all allotments extended to our vendors for both whole and half number orders. They also issued all extensions of allotments for Half Order Numbers. The CMP Engineer in the field made a request to the CMP Section in Wilmington for controlled materials for each Whole Number order by a form teletype. He also issued the necessary extension of the allotment to the vendor.

4. Expediting and Priorities

The primary function of materials and equipment for Projects 9733 was the coordination between the Wilmington Expediting Section and the Project Expediting Section. The primary function of these departments was to obtain favorable delivery dates for materials and equipment in accordance with the Field requirements. The Wilmington Expediting Section was directly responsible for the expediting of all half-number purchase orders except in cases where it was agreed in Wilmington that the material could be best expedited by the Field. The Project Expediting Department was likewise responsible for the expediting of whole-number purchase orders placed by the Field.

(a) Wilmington Expediting

All half-number orders were expedited whether or not action

was requested by the Field. Because of the comparatively small number of equipment orders, it was possible to follow them in detail. When sufficient improvements in deliveries could not be obtained through routine channels, the Project Expediting Department requested more drastic action. If the required shipping date was still not met, the Field requested still more stringent action. Expediting of material and equipment by the Wilmington section was brought about in the following manner:

- (1) Contact by telegraph to establish or confirm a shipping date,
- (2) Contact by telephone to improve delivery dates,
- (3) Contact by du Pont Field Expediter who investigated shop conditions and aided vendors in obtaining critical materials,
- (4) Other experienced and highly trained Company representatives,
- (5) Request special scheduling and assistance from the War Production Board,
- (6) Request aid of the Corps of Engineers, U. S. Army,
- (7) Request emergency action by the Secretary of War.

The Wilmington Expediter also performed several other duties such as securing authorizations from the Design Division for substitutes of critical material and equipment. He also obtained authorizations for overtime from the Field Project Manager and the Area Engineer and relayed this information to the vendor who had previously promised improvement in delivery by working overtime. In many cases, he altered the shipping instructions as requested by the Field in order to expedite transportation and, in case of rush shipments, secured necessary tracing information which was forwarded to the Traffic Department for expeditious handling.

Field Expeditors were assigned by the Wilmington Section to visit vendors' plants for the purpose of improving delivery of orders for Projects 9735 and 88. Individual reports for each order were made up and forwarded by air mail to the Project Expediting, thereby giving the Field first hand information. If the information shown on the Field Expediter's report was un satisfactory, a teletype was sent to Wilmington advising

Field Expediting

In 1943, the Field Expediting Section was set up in the Knoxville Office to handle both half and whole-number expediting and reported directly to the Control Superintendent. Later, on March 22, 1943, the Field Expediting Section was subdivided into whole and half-number expediting both reporting to the Engineering Office Superintendent. The division of the department was necessary on this project for the following reasons: The whole-number expediting portion was located in Knoxville since building materials were pro-

placed locally by the Field Purchasing Department, also located in Knoxville, because of the necessity of adequate telephone service. Most of the material was furnished by local supply houses, jobbers, and wholesalers. Expediting action was not required on all whole-number orders because a large number of these were delivered from local stock on the same day that the order was placed.

Half-number orders were expedited under an entirely different set of conditions than those offered in the above paragraph; consequently, it was logical to establish this portion of the department at the plant site. Relying on the fact that half-number orders were requisitioned and purchased by Wilmington and that these orders covered equipment which had to be designed and fabricated according to specifications, with deliveries being generally long-termed depending upon the allocation of steel, other critical materials, and the manufacturers' sequence schedule. Telephone service was not of primary importance since most contacts were by teletype through Wilmington and the teletype unit was permanently installed at the plant site. Expediting assistance was given to subcontractors upon request by the organization for critical material and repair parts for their construction equipment.

(c) Priority Ratings and Directives

The priority rating originally assigned to du Pont for the construction of the TNX Area at Clinton Engineer Works was AA-3. On April 5, 1945, the Company received a blanket priority rating of AA-2X applicable to materials and equipment pertinent to construction. The Company immediately notified all vendors with whom orders had been previously placed of this change in rating. The Wilmington Priority Section notified the Field on August 19, 1945, that they had received PD-3A Certificate 1134007, which was an authority to assign AA-1 rating to cover a limited amount of purchases, totalling not more than \$1,455,000, of process equipment and process material, yet to be ordered for Projects 9733 and 58. Of this amount, the Field was permitted to use up to \$455,000. This rating could not be used to up-rate orders already placed and was too late to be of any great value in retaining the start-up and completion dates for these projects. This rating could only be applied to approximately \$175,675.00 of these orders and only \$ 31,177.45 of whole-number orders.

Later in the latter part of April, when it was found that existing priority ratings of limiting start-up equipment were not sufficiently high to provide favorable delivery dates for this equipment and material, the Company set about to improve these deliveries by requesting AAA priorities on equipment and material falling within this category. AAA ratings were received on approximately one-third of the half-number purchase orders, not including ten directives issued by the War Production Board for instruments and special electrical equipment

necessary for the start-up of the Process Area.

Inspection

The inspection of materials and fabricated equipment was done by the Wilmington Inspection Section. Inspection was confined mainly to half-number purchase orders for special plant equipment and special building material; however, inspection was required for several whole-number purchase orders and these inspections were handled by the Wilmington Inspection Section as requested by the Field through Wilmington. Inspectors were assigned to the rolling, cutting and fabrication of 25-12 CR stainless steel material and equipment. Test coupons and samples of stainless steel were sent to the du Pont Experimental Station at Wilmington, Delaware. All purchase orders carried a clause specifying whether or not the material and equipment was to be inspected by du Pont prior to shipment to the Field. Approximately 15% of the half-number purchase orders required inspection. Orders were placed by the Field Purchasing Department for the fabrication of equipment by local machine shops and vendors requiring inspection from time to time. Inspection of these orders were made daily during fabrication by the Craft Superintendent or representative of that department to watch for faulty construction and to eliminate possible errors in fabrication.

6. Disposal Excess Materials and Equipment

During the latter part and at the end of construction when construction materials and equipment, and small tools were no longer needed by the field forces, they were declared excess by the Craft Superintendents, Division Engineers, and Department Heads. It was the responsibility of the Excess Material Department to collect, warehouse, and dispose of these according to the procedure approved by the Area Engineer for disposal of excess government-owned equipment and materials at Clinton Engineer Works. The excessing of materials began on September 4, 1945, when six 2-cubic yard mixer trucks were transferred from du Pont property records to Ford, Bacon & Davis, Inc.

When receipt of a properly authorized excess material declaration was received, the Excess Material Department inspected and arranged for the material, in most cases, the material or the equipment was stored in excess material yard and storage tent; however, in some cases considerable handling was involved, the material was moved in place and turned over directly or loaded out from that point. Having checked the material and equipment excessed by the field, the Excess Material Department sent a formal declaration to the Procurement Section and Property Officer of the local Area Engineer's Office advising quantity, complete description, condition, original procurement number, cost to be credited, unit price, and total value. Copies of these declarations were sent to all prime contractors at Clinton Engineer Works. Requests for material were made directly to

the du Pont Excess Material Department by the prime contractors, but requests for major construction equipment had to be cleared through the Procurement Section for allocation.

Special authority and priority was given Clinton Laboratories, the contractors, by which they could obtain any items of surplus major construction equipment and building materials without the prior approval of the Procurement Section of the Area Engineer's Office. Tally-out sheets were issued by the Excess Material Department at the time the material left the plant site. The signatures of an authorized contractors employee, the du Pont Excess Material Clerk, and the Government Plant Property Officer were required before the material could leave the plant site. Two copies of the tally-out were sent to the Government Procurement Section and Government Property Section in order that this project be credited with the transfer of this equipment and the receiving contractor be credited with same.

The Company, in the beginning, was advised by the Area Engineer against advertising surplus materials and major construction equipment to other du Pont Projects and contractors outside the Clinton Engineer Works reservation, as it was determined that all excess could be used by prime and subcontractors on the Clinton Engineer Works.

A total of 588 declarations amounting to approximately \$916,155.52 were made up to March 23, 1944, for the disposal of surplus materials, excess major construction equipment, and small tool for Projects 9753 and 58.

At the beginning of construction and from time to time, the Area Engineer advised that an estimate of electrical materials, general building materials, piping materials, equipment, small tools and construction equipment be made for this project and obtained by Government Transfer regardless of the fact that design had not been released and the full scope of the work was still unknown. Deliveries for all types of construction material and equipment were becoming critical and there was a considerable quantity of Government owned material equipment available for immediate transfer and use from previously completed government projects. The Government assumed that it would be better to maintain a stock than to delay the construction work for the want of material. The government also advised that surplus items which might be incurred could be used at Clinton Engineer Works by other construction and operating contractors, which were not actively engaged at that time.

It was necessary to maintain a large quantity of spare parts for major equipment as a majority of this type of equipment was obtained from excess and varied in type and make and was in constant need of repairs, as this equipment was badly worn and outdated. Over-stocking of spare parts amounted to approximately \$75,000.00.

Du Pont was likewise required to maintain an ample stock of lumber due to the changing scope of work involved for this project. It was highly critical an allocation of two to three times the amount required. An over-stocking of approximately 30% of lumber was involved.

Additional office furniture and equipment in the amount of \$85,000.00 was procured by du Pont through excess for Clinton Laboratories beyond requirements shown on furniture list for this project, which increased the transfers out by the same amount.

Included in the transfers out was approximately \$215,000.00 for major equipment and \$125,000.00 for small tools.

The Company was in a very favorable position at Clinton Engineer Works in regard to disposal of excess material and equipment. Du Pont was the first major prime Contractor to close out construction work and surplus building materials and equipments were in demand by other construction and operating contractors on the reservation.

Clinton Laboratories was the largest buyer, taking approximately 68% of general building materials, 40% major construction equipment, 50% shop tools, and 25% small hand tools. The month of February, 1944, was the peak excess month in which approximately \$175,000 of material and equipment was handled. On March 11, 1944, the formal closing of field construction work, the balance of surplus materials and major construction equipment and tools only amounted to approximately \$15,000 and all remaining excess was disposed of by April 3, 1944.

I Major Construction Equipment

The procurement of major construction equipment for this project was accomplished in four ways: by government transfer from other construction projects through the assistance of the Area Engineer; by rental from equipment contractors; by loan from the Stone and Webster Engineering Corporation, prime contractor engaged in construction work at Clinton Engineer Works; and, by direct purchase.

Prior to the beginning of construction work, a list of major construction equipment required was prepared by the Craft Superintendents. When approved by the Field Superintendent and the Field Project Manager, the list was submitted to the Area Engineer for his assistance in obtaining the equipment at the earliest possible date.

Approximately 91% of the major construction equipment used by this project was obtained by government transfer. At the start of construction and at times of immediate necessity, pieces of major construction equipment were obtained by loan from the Stone and Webster Engineering Corporation until the requirements could be filled by government transfers, rentals, or purchases. The list of these pieces were obtained and returned is shown on the Construction Equipment List, pages 219 through 224, and consisted of the following equipment pieces: one bulldozer, one road roller, two small air compressors, one portable light plant, and four concrete vibrators. All procurement transfers and loans of equipment were handled by the Excess Material Department. The purchase of construction equipment was limited by the regulations of the War Production Board and late deliveries of new equipment.

The terms for the rental of equipment was specified by the Area Engineer insofar as recapture clause and price ceiling as set by the Office of Price Administration. Recapture provisions were not included in the rental contract when vendors refused to negotiate under these conditions. Negotiations for rental equipment were handled by the Cost and Contract Department of the Company after obtaining the prior approval of the Area Engineer.

The major excavation work for this project was subcontracted in [redacted] work as it was impossible, in a short period of [redacted] sufficient excavating equipment in reliable operation. During final stages of construction, Albert Brothers and Grading Subcontractor for this project, released [redacted] from their contract as the balance of the work was so scattered and had to be performed at such irregular intervals that it was not practical for them to keep their equipment on the project and it was impossible to keep operators steadily employed. The Area Engineer, on November 8, 1943, approved the release of Albert Brothers from the performance of the balance of the contract for excavating and grading work. The equipment of the contractors was taken over on a rental basis as a part of the release negotiations and consisted of the following equipment: One No. 75 Lorain Shovel, one Euclid Half-Track Dump Truck, one Bulldozer, one Tractor

with one 18 cu. yd. Carry-All Scraper, and one Tractor with one 18 cu. yd. Scraper.

Other pieces of major construction equipment were obtained on a rental basis and are shown in the Equipment List. The equipment was obtainable to obtain them by government transfer in a reasonable amount of time, or as a loan from any of the other contractors at the Clinton Engineer Works.

The only construction equipment purchased for this project was seven pumps which are noted on the Major Construction Equipment List. Previous transfers of similar equipment had proved unsatisfactory due to the short life of this type of equipment.

Each piece of construction equipment, when received, was assigned a Major Equipment or Rental Equipment Number and a government Code Number. The Transportation Department maintained current records on each piece of equipment and submitted to the Planning and Scheduling Department a weekly report of the hours "Worked" and the hours "In Shop", on a daily basis, for each piece of equipment. The report also provided such information as the date that the equipment was obtained or placed on "Excess".

A weekly report was prepared for the Government on each piece of equipment which stated the following information: Government Code Number, the du Pont ME Number, a brief description of the equipment, the hours worked, the hours idle, the hours in shop, as well as pertinent remarks relative to usage, repairs, date placed on excess, date of transfer and date of release if rental equipment. The report included all construction equipment except vibrators, portable light plants and pumps.

Current charts were kept of types of equipment showing the number of pieces, the available work hours, the actual hours of work, and the hours that the equipment was in shop. No segregation was made of the time a piece of equipment was idle when on an assignment. Equipment assigned to a job was reported as working. Unassigned equipment was reported as not working or in the shop.

Management was kept advised of the status and use of the construction equipment by the monthly submission of charts on the following items: Air Compressors, Bulldozers and Tractors, Graders, Flat Trucks, and Electric Welding Machines, as included in the Planning & Scheduling.

The cost of major construction equipment was included in the original Project Cost Estimate dated March 24, 1943, to cover the cost of purchase, rental fees, and improvements to the major construction equipment. Due to the increased scope of the work, this figure was later revised on August 6, 1943, to \$244,000. The peak value of expenditures and commitments for major construction equipment was \$245,642. At the close of construction, this figure was reduced as equipment was transferred to other government projects and credits allowed.

~~SECRET~~

CLINTON ENGINEER WORKS
PROJECTS 9733 AND 58
MAJOR EQUIPMENT LIST

TYPE AND
QUANTITY

DESCRIPTION

PROCUREMENT

Cranes

3

3 - In Moto-Crane 10-15 capacity, Model
K 90 A4

Government transfer

1 - J. Marion, Model 372-7466 w/ 80 ft.
rigged for hook work

Government transfer

1 - J. Marion, Model HP 298, Engine
249505 Bada

Borrowed from Stone & Webster
Engineering Corporation
Obtained 12-21-43
Returned 2-2-44

Tractors

9

3 - TD-18 International Diesel tractors
w/ Bucyrus-Krie bulldozer attachment

2 Government transfers, 1
borrowed from Stone & Webster
Engineering Corporation
Obtained 2-8-43
Returned 4-19-43

1 - HD Allis Chalmers gas driven tractor
w/ Baker bulldozer blade

Government transfer

1 - #50 Caterpillar gas driven tractor
w/ hydraulic take-off

Government transfer

1 - D6 Caterpillar tractor w/ side boom

Government transfer

1 - TD-14 International tractor w/ side boom

Borrowed from Stone & Webster
Engineering Corporation
Obtained 3-11-43
Returned 1-28-44

1 - Model L Allis Chalmers tractor
drum hoist

Government transfer

Tractors cont'd.	1 - Case farm tractor	Government transfer
Scrapers	1 - LeTourneau, 6 yd. Carry-All	Government transfer
2	1 - LeTourneau, 3 yd. narrow gauge hydraulic powered road scraper	Government transfer
Rollers	1 - LeTourneau, 8 T tandem wheel	Borrowed from State Engineer Engineering Corp. Obtained 3-6-43 Returned 1-15-44
2	1 - LeTourneau, 8 T tandem wheel, 10 T	Government transfer
Patrol Graders	2 - Martin western road patrols w/ 12 ft. blade	Government transfer
3	1 - Caterpillar No. 12 road patrol	Government transfer
Pile Drivers	#982 Terry Steam Hammer	Government transfer
1		
Hoists	2 drum 5000 lb. gasoline driven hoist	Government transfer
1		
Boilers	32 H. P. HRT boiler	Government transfer
1		
Trailers	1 - Two wheel Pole trailer, Hobbs	Government transfer
5	3 - Four wheel Peru farm wagons	Government transfer
	1 - Two wheel portable tar kettle, 2 bbl. capacity	Government transfer
Mixers	3½ cu. ft. concrete mixer	Government transfer
1		

Drills

Cleveland air operated wagon drill

Government transfer

1

Light Plants

3 K.W. portable gas driven 1-3 phase, 60 cycle, 110V-220V Generator

3 Government transfers, 2 borrowed from Stone & Webster Engineering Corporation. Obtained 3-31-45. Returned 5-13-45

15

3 K.W. portable gasoline driven 1-3 phase, 60 cycle, 110V Generators

Government transfer

Vibrators

11 P. gasoline driven concrete vibrators

7 Government transfers, 2 borrowed from Stone & Webster Engineering Corporation. Obtained 8-4-45. Returned 9-8-45

11

Compressors

1 - 315 CFM Gardner-Denver air compressor, gasoline driven

Government transfer

11

3 - 210 CFM air compressor (Chicago Pneumatic, Ingersoll-Rand, Gardner-Denver, Schram)

2 Government transfers, 1 borrowed from Stone & Webster Engineering Corporation

1 - 160 CFM air compressor, gasoline driven

Borrowed from Stone & Webster Engineering Corporation. Obtained 4-19-45. Returned 5-20-45

2 - 105 CFM air compressors, gasoline driven (1 - Worthington, 1 - Ingersoll-Rand)

Government transfer

4 - Stationary compressors 25 to 35 CFM, 2 gasoline driven & 2 electrically driven

Government transfer

Trucks

6 - 1 1/2 T dump trucks

Government transfer

68

43 - 1 1/2 T flat bed trucks

Government transfer

Trucks cont'd.

18 - 1 1/2 T concrete mixer trucks, 5 cu. yd. capacity

Government transfer

8 - 1 1/2 T panel trucks

Government transfer

1 - 1/2 T and 3/4 T pickup trucks

Government transfer

Passenger Vehicles

1 - 1/2 T panel trucks

Government transfer

19

1 - 1/2 T panel trucks

Government transfer

1 - 1/2 T panel trucks

Government transfer

1 - Harley Davidson motorcycle with side car

Government transfer

Welding Machines

19 - 300 AMP electric welding machines, gasoline driven

Government transfer

24

5 - 300 AMP welding machines, electrically driven

Government transfer

Pumps

4 - 4" Centrifugal gasoline driven pump

1 Government transfer
3 Direct purchase

16

1 - 4" Double Diaphragm gasoline driven pump

Government transfer

1 - 3" Centrifugal pump, gasoline driven

Government transfer

1 - 3" Single Diaphragm gasoline driven pump

Government transfer

4 - 2" Centrifugal gasoline driven pump

Government transfer

5 - 1 1/2" Centrifugal gasoline driven pump

Direct purchase

RENTAL EQUIPMENT LIST
E. I. DU PONT DE NEMOURS & COMPANY
CLINTON ENGINEER WORKS
PROJECTS 9733 & 58

R.E.NO.	DESCRIPTION	RENTAL COMPANY	DATE RENTED	DATE RELEASED
1	Dodge 1 1/2 Ton Dump Truck	Broadway Maintenance Corp.	3-30-43	4-26-43
2	#10 Caterpillar Road Auto Patrol	B. G. Young & Son	4-3-43	4-31-43
3	Hoehring Crane 301, w/ 25' Boom, and 3' Jib and Shell Basket	A. J. Goldman	4-23-43	5-30-43
4	American Crane w/ 150 Goose Neck Extension	V. L. Nicholson Co.	5-1-43	12-10-43
5	Blaw-Knox Batch Plant, 105 Ton Triple Bin Concrete Batch Plant w/ 3 Beam Scale	Wilson, Wessner & Wilkinson	5-6-43	9-11-43
6	International Model 18 TR Tractor w/ Le Tourneau Hoist	Albert Bros.	5-31-43	12-16-43
7	Bucyrus Erie Crane Type 1055	Albert Bros.	6-22-43	9-26-43
8	Schramm S15 C.F. Air Compressor	Albert Bros.	6-23-43	10-9-43
9	Ingersoll-Read "Mobil-Air" Compressor - 500 C.F.	Albert Bros.	7-2-43	11-10-43
10	2250 lb. Pile Hammer	V. L. Nicholson Co.	7-1-43	7-8-43
11	Caterpillar Diesel Motor Patrol	Albert Bros.	8-5-43	10-2-43
12	Lorain #78 B Shovel	Albert Bros.	11-8-43	12-16-43
13	TD 16 International Tractor	Albert Bros.	11-8-43	12-11-43
14	Kuclid Half Track Dump Truck	Albert Bros.	11-8-43	12-11-43



15	TD 18 International Tractor w/ Easyrus-Erie Bulldozer Attachment	Albert Bros.	11-8-43	12-16-43
16	D 7 Caterpillar Bulldozer w/ 3 Drum Power Take-Off	Albert Bros.	11-8-43	12-16-43
17	Le Tourneau Carry-All Scraper	Albert Bros.	11-8-43	12-16-43
18	La Plant - Scraper	Ed. Carrimore	11-8-43	12-16-43



VI SUBCONTRACTS

Twenty-five subcontracts were awarded by the [redacted] for the construction of Projects 9733 and 36 at [redacted] works. This group includes two general types of contracts, Cost-Plus-A-Fixed-Fee and Lump Sum which includes unit price contracts. Of the total, only two were Cost-Plus-A-Fixed-Fee--the Piping Contract, awarded to the B. F. Shaw Company, and the Electrical Contract, awarded to the Broadway Maintenance Corporation. Eleven of these contracts, covered by half number purchase orders, were negotiated by the Wilmington Office of the Company; and the balance, covered by whole number purchase orders, were negotiated and awarded by the field with the approval of the Wilmington Office and the Area Engineer.

Contracts which required the approval of drawings by the Design Division are usually handled by the Contract Department, Construction Division, located in the Wilmington Office. Awarding of these contracts requires technical knowledge in various branches of engineering and, in most cases, the Division initially submit their requirements for a certain amount of equipment and construction to vendors who, in turn, submit their design in accordance with the required specifications. Contracts are made directly with vendors in order to eliminate delay in the awarding of such contracts.

A summary sheet for each subcontract is included herein that incorporates detail information pertaining to the awarding and performance of each subcontract.

1. Cost-Plus-A-Fixed-Fee Contracts

The two Cost-Plus-A-Fixed Fee Subcontracts were identical with one exception wherein the electrical subcontractor, Broadway Maintenance Corporation, was required to furnish only necessary labor and supervision for the installation of the electrical systems for this plant; while the piping subcontractor, B. F. Shaw Company, was required to furnish all labor, supervision and materials as specified in the contract to properly fabricate, assemble and install the piping for the plant. In the case of both Cost-Plus-A-Fixed Fee contracts, special services were rendered by the du Pont Company in the extent of receiving, transporting and storing of materials, furnishing of necessary tools, machinery, equipment and handling of subcontractors' payrolls.

2. Lump Sum Contracts

Included in the group of Lump Sum Contracts were four contracts which were based strictly on Unit Price, such as the Excavating Contract awarded to Albert Bros., Inc., on unit price basis per cubic yard for all types of excavation, and the Hauling Contract, awarded to A. J. Metler on the unit price tonnage basis, the contract awarded to Grinnell Co., Inc., for the installation of sprinkler fire protection systems, and the insulation contract, awarded the Armstrong Cork Co. on unit price basis per ft. for

certain classes and types of insulation. These contracts were so awarded to insure a method for payment of additional work beyond the time when the contract was originally signed. The following contracts fall into this category: the Roofing and the contract awarded to J. D. Halton Roofing Company, and the contract awarded to the Smory Construction Company, Inc.

The du Pont Company also extended special services and facilities to Lump Sum Contractors as governed by the individual contracts. Insurance under the Government War Rating Insurance Plan, at no cost to the subcontractor, provided insurance protection for the subcontractor but applied only to operations of the subcontractor while working on the plant site. Insurance coverage was extended for the following:

- (a) Workman's Compensation
- (b) Automobile, bodily injury, liability
- (c) Automobile property damage
- (d) Comprehensive bodily injury liability

Necessary facilities, such as electric power, lighting, were also furnished at no cost to the subcontractors, as not required in the Invitation to Bid. An additional electric included in the contracts held by the Link Belt Company, Bridge and Iron Company, Rust Engineering Company, Cement Company, Haughton Elevator Company, and Grinnell Company, transporting, free of charge, material, tools, and construction equipment from Byington, Tennessee, to the plant site and return, as the Invitation to Bid likewise stated that this service would be rendered by du Pont.

B Reasons for Subcontracts

The awarding of subcontracts for certain phases of construction work for this project was initiated for the following reasons: to expedite construction, to obtain labor and supervision specialized in some particular type of work, to eliminate purchase of special machinery and equipment needed only for a short period of time, to secure the very best workmanship in the fabrication of material and equipment, to make use of extensive organization and personnel of specialized contractors, and to obtain use of certain patent rights

C Agreements

sent out to competent contractors for all proposed work and Fixed Fee Subcontracts. Successful bidders were required to enter into a formal subcontract in the event that the contract price was in excess of \$2000. If less than \$2000, a Purchase Order Contract was written to cover the proposed work.

Both types of contracts, Lump Sum and Fixed Fee, contain identical articles of agreement with the exception that the fixed Fee Contract contains an additional Article III, Cost of the Work, for which the Fixed Fee Contractor was reimbursed for all actual expenditures in performance of the work. Listed below in chrono-

logical order is a brief outline of the articles of agreement required by the formal contract:

- Article I - Scope of the work: Detail outline of the work to be performed and material to be supplied as specified in the Invitation to Bid.
- Article II - Changes, Terminations: Specifies that du Pont may change the extent or amount of the work with the approval of the Contracting Officer, and shall have the right to terminate a Sub-Contract at any time on an equitable settlement basis.
- Article III - Compensation of Sub-Contractors' Payment: Indicates the amount of the contract and method of payment for all work performed by the Sub-Contractor.
- Article IV - Approval: States that Sub-Contract shall not be binding until approved by the Contracting Officer.
- Article V - Disputes: Method of handling and settling all disputes between the Sub-Contractors and the Company.
- Article VI - Co-ordination: Requests the cooperation of the Sub-Contractors with other Contractors that work at the locality.
- Article VII - Workmanship: Specifies that work shall be executed in the best and most workmanlike manner by qualified workers in strict conformity with standard practices.
- Article VIII - Insurance: States that the Sub-Contractor shall not duplicate the insurance coverage provided, at no cost, by du Pont and the Contracting Officer.
- Article IX - Release of Liens: Advise Sub-Contractors that final payment shall not be made until releases of all liens have been secured and presented in affidavit form to the Company.
- Article X - Contingencies: Sub-Contractor shall be temporarily excused from performing the work if interrupted by the inability to obtain essential materials, labor, or by labor disputes, or by reason of fire, explosion, accident or sabotage. Such work shall be performed as soon as practicable after such disabilities are removed.

- [REDACTED]**
- Article XI - Default of Sub-Contractor: The Company, with the approval of the Contracting Officer, may take over the work and prosecute to completion if the Sub-Contractor refuses or fails to prosecute the work assumed by the Sub-Contract.
- Article XII - Rates of wage, no rebate, Eight Hour Law, Overtime Rates and Shifts, Fair Labor Standards Act, Convict Labor, Anti-Discrimination, Price Control: The Sub-Contractor agrees to abide by and conform to all provisions of these acts and regulations.
- Article XIII - Employees: The Contracting Officer and du Pont retain the right to request the dismissal of Sub-Contractors' employees as they deem incompetent.
- Article XIV - Performance and Payment Bond: The Sub-Contractor shall, if required by du Pont with the approval of the Contracting Officer, furnish the Company with acceptable security performance and payment bonds in an amount or on specified forms approved by du Pont and the Contracting Officer.
- Article XV - Subletting Assignment: No part of the Sub-Contract shall be sublet without the approval of the Contracting Officer. Claims for monies due or to become due to the Sub-Contractors by du Pont may be assigned to any bank or trust company.
- Article XVI - Title: du Pont reserves the right of final inspection, acceptance or rejection of materials, tools, machinery, equipment and supplies furnished by the Sub-Contractor. In the event of rejection, the Sub-Contractor shall be responsible for the removal of the rejected property within a reasonable time.
- Article XVII - Labor Disputes: The Sub-Contractor will immediately give notice thereof to du Pont whenever an actual or potential labor dispute is delaying or threatens to delay the timely performance of the Sub-Contract.
- Article XVIII - Integration: The contract contains the entire agreement between the parties of the contract and there are no understandings, representations or warranties not set up within.
- [REDACTED]**
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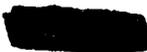
- [REDACTED]
- Article IV - Damage by Enemy Operations: Sub-Contractor shall not be liable for damage to, or destruction of, the work resulting from enemy operations.
- Article V - Safety and Health Requirements: The Sub-Contractor is required to comply with all pertinent provisions of the "Safety Requirements Excavations-Building-Construction" approved by the Chief of Engineers, dated December 16, 1943.
- Article VI - Disclosure of Information: It is understood that disclosure of information relating to the work contracted for, to any person not entitled to receive it, or failure to safeguard all Secret, Confidential or Restricted information that may come to the Sub-Contractor or Sub-Contractors' personnel, are subject to Criminal Liability under the Laws of the United States.
- Article VII - Employment of Aliens: Sub-Contractor will not permit any alien employee to have access to drawings, specifications, or matters relating to the performance of the Sub-Contract.
- Article VIII - Covenant Against Contingency Fees: The Sub-Contractor will not employ any person to solicit or secure a Sub-Contract upon any arrangements for a commission, percentage or contingent fee. This does not apply to commissions payable by the Sub-Contractor upon contracts or sales secured, or made, to bona-fide established commercial agencies for Sub-Contracts.
- Article IX - Officials not to Benefit: No member or delegate to Congress or Resident Commissioner shall be permitted to share any or part of a Sub-Contract, or to any benefits that may arise therefrom.
- Article X - Definitions: The term Contracting officer shall mean the Contracting officer who personally executes contracts, or his duly successor.
- Article XI - Changes: To incorporate changes made in a contract before actually signing by parties.

D Erection Supervisors and Services

The services of Erection Supervisors were requested in the erection and installation of special equipment to provide maximum insurance of good workmanship, proper responsibility for final operating condition of equipment, and completion in the shortest possible time.

A list comprised of twelve erection engineers and seven other service groups are included herein. Of this group, the services rendered by the Erection Engineers for the Blue Flame Gas Service, Inc., Hevi Duty Electric Company, the Grover Company, Permutit Company, Roberts Filter Manufacturing Company, the Game-well Company, and the Mic-Mil Company were included in the purchase price of original order; while, on the other hand, the other Erection Supervisors' expenses and fees were covered by purchase order requisitions originating in the field.

All Erection Supervisors are required to furnish du Pont with insurance certificates showing full coverage for Workman's Compensation, Public Liability, Bodily Injury and Property Damage if automotive equipment was used before starting work on this project.


 CHRISTIAN ENGINEERING CORP.
 PROJ. CTS 9733 and 58
ERECTION SUPERVISORS & INC. SERVICES

<u>YFG NO.</u>	<u>VENUE</u>	<u>DATE ARRIVED</u>	<u>DATE COMPLETED</u>	<u>TYPE OF WORK</u>	<u>CHARGE</u>
406c	Bird Mach. Co. South Philadelphia, Pa.	9-29-43	11-3-43	Erection Eng. Centrifuges, Bldg. 205	\$596.88
818d	Blue Flame Gas Service, Inc. Kingsport, Tenn.		10-30-43	Erection Eng. Propane Gas System Bldg. 726	No charge covered in original order.
576	Combustion Eng. Co. Philadelphia, Pa.	5-10-43	7-3-43	Erection Eng. Boilers, Bldg. 801	\$1228.30
587d	Hevi-Duty Elec. Co. 4212 W. Highland Blvd. Milwaukee, Wis.	6-21-43	6-22-43	Erection Eng. Elec. Furnace Bldg. 205	No charge covered in original order.
3566	The Oilgear Co. Milwaukee, Wis.	9-4-43	1-10-43	Erection Eng. Hydraulic Pumps, Bldg. 105	\$804.61
40d 90d 190d 845d	The Permutit Co. 330 W. 42nd St. New York, N. Y.	6-14-43 9-24-43	6-16-43 9-26-43	Erection Eng. Water Softener Bldg. 801	No charge covered in original order.
4102	Pittsburgh Testing Laboratory 921 Fifth Ave. N. Birmingham, Ala.	10-16-43	11-4-43	Care drilling and testing, Bldg. 206	\$780.42

462	Roberts Filter Eng. Company Darby, Pa.	6-7-43	10-30-43	Erection Eng. Filter Equipment Bldg. 813	No charge covered in Original Order.
2726	The Hartman Boiler Inspection & Insurance Co. 1325 Citizens & South- ern Nat'l. Bldg. Atlanta, Georgia	6-23-43	6-23-43	Boiler Inspection Bldg. 801	\$55.00
1282	Knoxville Awning Tent & Tarpaulin Co. 2200 S. Cumberland Knoxville, Tenn.	5-19-43	5-22-43	Erection Supv. Temporary tent, Bldg. 105	235.75
3047 2453	H. H. Robertson Co. Pittsburgh, Pa.	8-14-43 7-29-43	8-18-43 9-25-43	Erection Eng. Siding, Bldg. 105	\$1344.68
2614	J. C. Sumner Knoxville, Tenn.	7-19-43	7-22-43	Scale services Bldg. 104	86.69
1938	Toledo Scale Knoxville, Tenn.	6-26-43	6-26-43	Scale Service Bldg. 105	15.00
1595	W. W. Woodruff Hard- ware Company Knoxville, Tenn.	5-22-43	6-15-43	Erection Eng. Air Conditioning System, Bldg. 102	101.90
2372	Same as above	7-13-43	7-23-43	Refrigeration Unit Bldg. 708	166.66
3048	Same as above	8-11-43	8-17-43	Refrigeration Unit Bldg. 706	53.75

4146 4654	Young Sales Corp. Nashville, Tenn.	10-18-43	10-27-43	Furnish Material & Erection Supervisor Mastic Flooring, Bldg. 205 - approx. 425 sq. ft.	\$423.78
3039	The Nic-... Co. Cleveland, Ohio	10-8-43	10-8-43	Furnish Material & Erection Supervisor to insulate 216" pipe for process line	\$1,056.29
2549	Hurley right & Powell, Inc. Knoxville, Tenn.	7-14-43	7-14-43	Insurance for white Wing Ferry	219.75
4572	The Grover Co. 1240 Pine St. Detroit, Mich.	11-26-43	12-2-43	Erection Supervisor installation pneu- matic tube system Bldg. 105	323.50
1749	The Gamswell Co. Newton Upper Falls, Mass.			Erection Supervisor Gamswell fire alarm System	No charge covered in the original order

CLINTON ENGINEER WORKS
PROJECTS 9733 & 58
INDEX SUBCONTRACTS

<u>ORDER NO.</u>	<u>COMPANY</u>	<u>TYPE OF WORK</u>
XPG 37½	Layne Central Co.	Drilled and installed drinking water well.
XPG 38½	Link Belt Co.	Furnished and erected coal handling equipment - Bldg. 801 Boiler House.
XPG 43	B. F. Shaw Co.	Piping subcontractor
XPG 85	Emory Construction Co.	Constructed temporary construction storage shed.
XPG 86½	Chicago Bridge & Iron Co.	Dismantled and re-erected elevated water storage tank.
XPG 105½	Rust Engineering Co.	Constructed 3 reinforced concrete chimneys for Bldgs. 112, 105, & 801.
XPG 113½	J. E. Winans	Transported and erected 2 boilers in Bldg. 801.
XPG 114½	Cement Gun Co., Inc.	Constructed 11 pre-stressed "Gunite" tanks.
XPG 161½	General Electric X-Ray Corp.	Furnished and installed X-Ray equipment in Bldg. 719.
XPG 209	Johnson & Willard	Constructed Receiving and Stores Bldg.
XPG 231½	Houghton Elevator	Furnished and erected 1 elevator in Bldg. 105.
XPG 252	Brothers Bros. Contractors, Inc.	Excavating and grading contractors.
XPG 255	Johnson & Willard	Constructed Main Office Bldg.
XPG 324	Broadway Maintenance Corp.	Electrical subcontractor.
XPG 397½	Warner Elevator Co.	Furnished and installed 1 elevator in Bldg. 105.

[REDACTED]

XPG 845½	Grinnell Co., Inc.	Furnished and installed Sprinkler Systems Bldgs. 105 & 706-A.
XPG 424 & 760	A. J. Motler	Hauling Contractor.
XPG 745½	Armstrong Cork Co.	Insulating subcontractor.
XPG 927	J. D. Helton Roof- ing Co	Roofing and waterproofing subcontractor.
XPG 1384	Emery Construction Co.	Masonry subcontractor.
XPG 1520	McCabe Construction Co.	Furnished and installed boiler brick work for Bldg. 801.
XPG 2005	Young & Bertha Co.	Furnished and installed duct work for Bldg. 205.
XPG 2375	O'Neill Extermina- ting Co.	Fumigated Receiving & Storage Bldg.
XPG 3037	Chattanooga Boiler & Tank Co.	Repaired temporary auxiliary boiler
XPG 3230	Combustion Engineer- ing Co.	Installed 2 new boiler tubes in Bldg. 801.

[REDACTED]

SUMMARY SUBCONTRACTS

- (1) **Firm Name - LAYNE CENTRAL COMPANY**
- (2) **Address - MEMPHIS, TENN.**
- (3) **Work Performed - WELL FOR CONSTRUCTION SERVICE**
- (4) **Type of Contract - LUMP SUM**
- (5) **XPG Number - 37½**
- (6) **Date subcontract awarded - JANUARY 30, 1943**
- (7) **Date subcontractor was scheduled to be complete - A.S.A.P.**
- (8) **Actual Starting Date - FEBRUARY 2, 1943**
- (9) **Actual Completion Date - MARCH 5, 1943**
- (10) **Cost - \$6,950.00**
- (11) **Bid Tabulation**

LAYNE CENTRAL CO.	\$3,510.00
MORRIS FORGE & DRILLING CO.	4,100.00
VIRGINIA MACHINERY & WILL CO.	DID NOT BID

- (12) **Reason for Award - LOWEST PRICE**
- (13) **Scope of Work - FURNISH LABOR, MATERIAL AND EQUIPMENT AND DRILLING 8' DIA. WELL AND FURNISHING AND INSTALLING PUMP FOR BLDG. 811.**
- (14) **Change Orders and Unusual Items - CHANGE ORDER NO. 1 IN THE AMOUNT OF \$3,440.00 FOR ADDITIONAL DEPTH OF 400 FT. AND ADDITIONAL PUMP SETTING 100 FT.**

- [REDACTED]
- (1) Firm Name - LINK BELT COMPANY
 - (2) Address - 2045 HUNTING PARK AVENUE, PHILADELPHIA, PA.
 - (3) Work Performed - COAL HANDLING EQUIPMENT
 - (4) Type of Contract - LUMP SUM
 - (5) XPG Number - 38½
 - (6) Date subcontract awarded - FEBRUARY 22, 1943
 - (7) Date subcontractor was scheduled to be complete - A.S.A.P.
 - (8) Actual Starting Date - MAY 31, 1943
 - (9) Actual Completion Date - JUNE 25, 1943
 - (10) Cost - \$12,942.00
 - (11) Bid Tabulation

LINK BELT CO. \$12,942.00

- (12) Reason for Award - THIS VENDOR SELECTED AFTER SURVEY OF PRESENT MARKET CONDITIONS AS BEST ABLE TO MEET REQUIRED COMPLETION DATE; TO ELIMINATE DELAY IN SECURING WPB APPROVAL UNDER L-193; GENERAL FEATURES OF DESIGN DUPLICATING PREVIOUS WORK ON WHICH VENDOR WAS LOW BIDDER; AVAILABILITY OF SHOP DRAWINGS FOR PRODUCTION.
 - (13) Scope of Work - FURNISHING, FABRICATING, AND ERECTING COAL HANDLING EQUIPMENT FOR BLDG. 801
 - (14) Change orders and Unusual Items - CHANGE ORDER NO. 1 IN THE AMOUNT OF \$53.00 TO ALTER CENTER DIMENSIONS OF ELEVATOR FROM 72' 1½" TO 75' 7½".
- [REDACTED]

SUMMARY SUBCONTRACTS

- (1) **Firm Name - BENJAMIN F. SHAW COMPANY**
- (2) **Address - WILMINGTON, DELAWARE**
- (3) **Work Performed - PIPING**
- (4) **Type of Contract - COST PLUS FIXED FEE**
- (5) **XPG Number - 43**
- (6) **Date subcontract awarded - MARCH 15, 1943**
- (7) **Date subcontractor was scheduled to be complete - NOVEMBER 25, 1943**
- (8) **Actual Starting Date - MARCH 1, 1943**
- (9) **Actual Completion Date - MARCH 11, 1944**
- (10) **Cost - APPROXIMATELY \$20,432.00**
- (11) **Bid Tabulation - (FIXED FEE BASES ON ESTIMATED COST)**

BENJAMIN F. SHAW CO.	\$8,550.00
JOHN F. HUMPERKY & THOS. G. O'CONNOR COMPANY	9,000.00
J. M. GALLAGHER CO.	13,500.00
JOHN BOUCHARD & SONS CO.	36,000.00
- (12) **Reason for Award - LOWEST PRICE**
- (13) **Scope of Work - FURNISHING LABOR & MATERIALS FOR FABRICATING AND INSTALLING PIPING SYSTEMS - PROJECTS 9735 & 58 - ORIGINAL ESTIMATE \$225,000.00 for LABOR & \$225,000.00 FOR MATERIALS.**
- (14) **Special Conditions and Unusual Items - SUPPLEMENTAL AGREEMENT**

SUMMARY SUBCONTRACTS

- (1) Firm Name - EMORY CONSTRUCTION COMPANY
- (2) Address - 2442 N. BROADWAY, KNOXVILLE, TENN.
- (3) Work Performed - CRAFT SUPT'S BLDG.
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 85
- (6) Date subcontractor was scheduled to be complete -
FEBRUARY 4, 1945
- (8) Actual Starting Date - FEBRUARY 8, 1945
- (9) Actual Completion Date - FEBRUARY 19, 1945
- (10) Cost - \$1,989.00
- (11) Bid Tabulation

EMORY CONSTRUCTION CO.....	\$1,989.00
JOHNSON & WILLARD.....	2,279.00
V. L. NICHOLSON CO.....	2,750.00
- (12) Reason for Award- LOWEST PRICE
- (13) Scope of Work - FURNISH LABOR AND MATERIAL FOR THE CON-
STRUCTION OF TC-8 CRAFT SUPT'S BLDG. 1-WOOD FRAME
BUILDING 20' 0" x 80' 0", 8' 0" EAVES, ELECTRICAL
WORK NOT INCLUDED.
- (14) ~~Special~~ and Unusual Items - NONE

SUMMARY SUBCONTRACTS

- (1) Firm Name - CHICAGO BRIDGE & IRON COMPANY
- (2) Address - 1700 WALNUT ST., PHILADELPHIA, PA.
- (3) Work Performed - DISMANTLE, SHIP AND RE-ERECT TANKS
- (4) Type of Contract - LUMP SUM
- (5) XFC Number - 864
- (6) Date subcontract awarded - MARCH 8, 1943
- (7) Date subcontractor was scheduled to be complete - JUNE 1, 1943
- (8) Actual Starting Date - MAY 30, 1943
- (9) Actual Completion Date - JULY 21, 1943
- (10) Cost - \$9,170.00
- (11) Bid Tabulation
CHICAGO BRIDGE & IRON CO. \$9,980.00
- (12) Reason for Award - TANK ORIGINALLY FABRICATED AND ERECTED BY CHICAGO BRIDGE & IRON CO. CERTAIN REPLACEMENT PARTS AND ADDITIONAL ACCESSORIES WERE REQUIRED AND SAME WERE MORE READILY AVAILABLE FROM THIS ORIGINAL SUPPLIER OF THE EQUIPMENT. VENDOR ALSO HAD MEN AVAILABLE TO DISMANTLE AND RE-ERECT STRUCTURE AT NEW LOCATION WHO WERE FAMILIAR WITH THIS MATERIAL.
- (13) Scope of Work - DISMANTLING AND RE-ERECTING ONE 50,000 GALLON ELEVATED STEEL TANK FOR EQUIPMENT NO. 815
- (14) Change Orders and Unusual Items - CHANGE ORDER NO. 1 IN THE AMOUNT OF \$190.00 FOR REVISION TO INCLINED LADDER

SUMMARY SUBCONTRACT

- (1) **Firm Name - RUST ENGINEERING COMPANY**
- (2) **Address - PITTSBURGH, PA.**
- (3) **Work Performed - 1 POWER HOUSE & 2 PROCESS STACKS**
- (4) **Type of Contract - LUMP SUM**
- (5) **IPG Number - 1054**
- (6) **Date subcontract awarded - MARCH 13, 1943**
- (7) **Date subcontractor was scheduled to be complete - JULY 17, 1943**
- (8) **Actual Starting Date - APRIL 19, 1943**
- (9) **Actual Completion Date - AUGUST 31, 1943**
- (10) **Cost - \$48,352.55**
- (11) **Bid Tabulation**

RUST ENGINEERING CO.....\$48,352.00
ALPHONS CUSTODIS CHIMNEY CONSTRUCTION CO..54,560.00
CONSOLIDATED CHIMNEY CO.....60,355.00

- (12) **Reason for Award - LOWEST PRICE**
- (13) **Scope of Work - FURNISHING LABOR, MATERIAL & EQUIPMENT & CONSTRUCTING THREE REINFORCED CONCRETE CHIMNEYS FOR BLDGS. 105, 205 & 801.**

- (14) **Alterations and Unusual Items**
 - ALTERATION NO. 1 IN THE AMOUNT OF \$4,056.00 DECREASE CHANGED PER VENDOR'S LETTER DATED 3/30/43
 - ALTERATION NO. 2 IN THE AMOUNT OF \$2871.00, ADDITION OF BRICK FLOOR & PLACING THE PAVEMENT OF THE LINES PROCESS CHIMNEY
 - ALTERATION NO. 3 IN THE AMOUNT OF \$387.00 TO COVER WASHING DOWN INSIDE OF 205 STACK WITH HYDRO-CHLORIC ACID
 - ALTERATION NO. 4 IN THE AMOUNT OF \$2830.85 FOR OVERTIME, INCREASED LABOR RATES, ETC.
 - ALTERATION NO. 5 DECREASE IN THE AMOUNT OF \$268.30 FOR REINFORCING STEEL FURNISHED BY DU PONT

SUMMARY SUBCONTRACTS

- (1) Firm Name - J. E. WINANS
- (2) Address - 133 LESLIE AVENUE, MERCHANTVILLE, N. J.
- (3) Work Performed - BOILER ERECTION
- (4) Type of Contract - LUMP SUM
- (5) IPG Number - 1154
- (6) Date subcontract awarded - MARCH 19, 1945
- (7) Date subcontractor was scheduled to be complete - EIGHT WEEKS AFTER FOUNDATIONS ARE COMPLETE AND MATERIAL IS READY FOR LOADING
- (8) Actual Starting Date - MARCH 26, 1945
- (9) Actual Completion Date - JUNE 30, 1945
- (10) Cost - \$42,240.10
- (11) Bid Tabulation
J. E. WINANS\$41,000.00
- (12) Reason for Award - TO EXPEDITE INSTALLATION. IN THIS CASE, MANUFACTURER WAS UNABLE TO SUPPLY ERECTION CREW AND, IN PLACE THEREOF, NOMINATED THIS CONTRACTOR AS ONE QUALIFIED TO PERFORM THE WORK AND EXPERIENCED ON RECENT WORK OF SAME NATURE ON SAME BOILERS FOR U.S. NAVY.
- (13) Scope of Work - LOADING, TRANSPORTING AND ERECTING TWO BOILERS IN BLDG. 801
- (14) Changes and Unusual Items
ORDER NO. 1 IN THE AMOUNT OF \$1,250.00 -
FURNISHING AND INSTALLING BREECHING
ORDER NO. 2 DECREASED IN THE AMOUNT OF \$9.90
FOR BACKCHARGES

[REDACTED]

SUMMARY SUBCONTRACT

- (1) Firm Name - CEMENT GUN COMPANY
- (2) Address - ALLENTOWN, PENNSYLVANIA
- (3) Work Performed - GUNITE TANKS
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 114½
- (6) Date subcontract awarded - MARCH 17, 1943
- (7) Date subcontractor was scheduled to be complete - AUGUST 1, 1943
- (8) Actual Starting Date - APRIL 15, 1943
- (9) Actual Completion Date - DECEMBER 11, 1943
- (10) Cost - \$92,525.98
- (11) Bid Tabulation
 - CEMENT GUN COMPANY.....\$63,677.00
 - NATIONAL GUNITE CO.....65,063.00
 - PRESSURE CONCRETE CO.....80,877.00
- (12) Reason for Award - LOWEST PRICE
- (13) Scope of Work - FURNISHING LABOR, MATERIAL AND EQUIPMENT AND CONSTRUCTING TEN "GUNITE TANKS" (EQUIPMENT 206E)
- (14) Change Orders and Unusual Items

[REDACTED] ORDER NO. 1 IN THE AMOUNT OF \$11,167.00 TO COVER ALTERATIONS 1 TO 4 INCL. - 1 ADDITIONAL TANK 20' Ø" I.D. x 6' 6" DEEP FOR BLDG. 206, ADDITIONAL REINFORCING MESH, 1 PRIMER & TWO FINISH COATS OF BITUMASTIC PAINT

CHANGE ORDER NO. 2 IN THE AMOUNT OF \$17,681.98 TO COVER ALTERATIONS 5 TO 7 - ADDITIONAL BITUMASTIC PAINT AND TO REPAIR BOTTOM OF TANK AT BLDG. 706-A, ADDITIONAL LINING FOR SIX 50' IN DIA. TANKS AND TWO 25' IN DIA. TANKS, AND FOR BACK-CHARGES, OVERTIME, INCREASED LABOR RATES, ETC.

SUMMARY SUBCONTRACTS

- (1) Firm Name - GENERAL ELECTRIC X-RAY CORPORATION
- (2) Address - 2102 JACKSON BLVD., CHICAGO, ILL.
- (3) Work Performed - FURNISHED AND INSTALLED X-RAY EQUIPMENT
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 161½
- (6) Date subcontract awarded - MARCH 24, 1943
- (7) Date subcontractor was scheduled to be complete - A.S.A.P.
- (8) Actual Starting Date - JUNE 15, 1943
- (9) Actual Completion Date - JUNE 19, 1943
- (10) Cost - \$1,798.91
- (11) Bid Tabulation
GENERAL ELECTRIC X-RAY CORPORATION . . . \$1,801.46
- (12) Reason for Award - TO EXPEDITE PROCUREMENT
- (13) Scope of Work - FURNISH AND INSTALL X-RAY EQUIPMENT IN
BLDG. 719
- (14) Change Orders and Unusual Items - NONE

SUMMARY SUBCONTRACTS

- (1) Firm Name - JOHNSON & WILLARD
- (2) Address - 422 FRONT STREET, KNOXVILLE, TENN.
- (3) Work Performed - TWO CONSTRUCTION BLDGS.
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 209
- (6) Date subcontract awarded - FEBRUARY 13, 1943
- (7) Date subcontractor was scheduled to be complete - FEBRUARY 20, 1943
- (8) Actual Starting Date - FEBRUARY 17, 1943
- (9) Actual Completion Date - MARCH 2, 1943
- (10) Cost - \$5,141.00
- (11) Bid Tabulation
 - JOHNSON & WILLARD \$5,141.00
 - V. L. NICHOLSON COMPANY 5,272.00
 - EMORY CONSTRUCTION CO. 7,121.50
- (12) Reason for Award - LOWEST PRICE
- (13) Scope of Work - FURNISHING LABOR AND MATERIAL FOR THE CONSTRUCTION OF TWO TEMPORARY CONSTRUCTION BLDGS. TC-4 WOOD FRAME BLDGS. 30' 0" x 60' 0", 9' 0" EAVES
- (14) Change Orders and Unusual Items - NONE

SUMMARY SUBCONTRACT

- (1) Firm Name - HAUGHTON ELEVATOR COMPANY
- (2) Address - 1750 LUDLOW ST., PHILADELPHIA, PA.
- (3) Work Performed - ERECTING AND FURNISHING ELEVATOR
- (4) Type of Contract - LUMP SUM
- (5) XPO Number - 2514
- (6) Date subcontract awarded - APRIL 14, 1945
- (7) Date subcontractor was scheduled to be complete - ON OR BEFORE JUNE 30, 1945
- (8) Actual Starting Date - AUGUST 19, 1945
- (9) Actual Completion Date - SEPTEMBER 9, 1945
- (10) Cost - \$15,606.55
- (11) Bid Tabulation
 - HAUGHTON ELEVATOR CO. \$14,489.00
 - OTIS ELEVATOR CO. UNABLE TO QUOTE
- (12) Reason for Award - ONLY ACCEPTABLE SOURCES KNOWN-TO EXPEDITE DESIGN AND PROCUREMENT
- (13) Scope of Work - FURNISHING AND ERECTING ONE 12,000# ELEVATOR BLDG. 105
- (14) Change Orders and Unusual Items
 - ALTERATION NO. 1 IN THE AMOUNT OF \$579.00 FOR ADDITIONAL WAINSCOTING FOR ELEVATOR CAR
 - ALTERATION NO. 2 IN THE AMOUNT OF \$185.00 FOR OVER TIME WORK TO EXPEDITE INSTALLATION
 - ALTERATION NO. 3 - NO CHANGE IN COST
 - ALTERATION NO. 4 IN THE AMOUNT OF \$352.53 FOR BACK-LOGGED CHARGES, OVERTIME, INCREASED LABOR RATES, ETC.

[REDACTED]

SUMMARY SUBCONTRACTS

- (1) Firm Name - ALBERT BROS. CONTRACTORS, INC.
- (2) Address - SALEM, VIRGINIA
- (3) Work Performed - EXCAVATING AND GRADING
- (4) Type of Contract - UNIT PRICE
- (5) XPG Number - 252
- (6) Date subcontract awarded - FEBRUARY 22, 1943
- (7) Date subcontractor was scheduled to be complete - JUNE 1, 1943
- (8) Actual Starting Date - MARCH 1, 1943
- (9) Actual Completion Date - NOVEMBER 12, 1943
- (10) Cost - \$292,415.24
- (11) Bid Tabulation

ALBERT BROS. CONTRACTORS, INC.	\$75,510.00
FORCUM-JAMES	90,050.00
WALTERS & PRATER	92,800.00
CLARK, KEARNEY & STARK	100,550.00

(11a)

ITEM	APPROXIMATE QUANTITY	ACTUAL QUANTITY	TYPE
1	60,000 C.Y.	178,795	Dirt excavation including loading, hauling and disposing of same as directed by du Pont, up to 1,000 L.F. free haul \$0.45 per C.Y.
2		4,206	Rock excavation as above \$1.40 per C.Y.
3	1,000 C.Y.	25,524	Overhaul beyond 1,000 ft. free haul of dirt and rock and not exceeding 2,000 ft. \$0.20 per C.Y.
4	7,000 C.Y.	12,655	Dirt excavation water line to river based on cross section width of 48" \$0.70 per C.Y.

[REDACTED]

5	1,300 C.Y.	289	Rock excavation as in Item 4 as above \$3.00 per C.Y.
6	7,000 C.Y.	5,043	Backfill water line to river based on cross section width of 48" by depth to spring line of pipe \$0.25 per C.Y.
7	4,000 C.Y.	28,932	Dirt excavation, trenches, drainage sewer, and waterline ditches up to 48" wide cast along side (trenching machine, back hoe or similar equipment) no shoring \$0.70 per C.Y.
8	2,000	5,996	Rock excavation as 7 above \$5.00 per C.Y.
9	300	9,859	Rock excavation in crowded quarters, includes building foundations, footings, pits and other locations where blasting is restricted and must be done with permission and under the direct supervision of the Engineer. Cast along side \$6.00 per C.Y.
10		2,968	Extra cost for sheep foot rolling; measurement based on final volume \$0.10 per C.Y.
11	5,000 C.Y.	0	Dirt excavation cast along borrow pit as directed by du Pont \$0.38 per C.Y.
12	1,500 C.Y.	0	Rock excavation cast along borrow pit as directed by du Pont \$1.40 per C.Y.
13	2,000 C.Y.	0	Dirt backfill, placed in 6" layers mechanically tamped. Price to cover handling material at fill site. Tamping by du Pont. Note: This applies principally to contemplated filling in or around buildings or restricted areas. \$0.58 per C.Y.
14	2,000 C.Y.	1,154	Filling or leveling earth and rock with bulldozer \$0.25 per C.Y.
15	5,000 C.Y.	48,949	Loading, hauling and disposing of excavation from Items 7, 8, 9, 11, & 12 also spoil banks and similar conditions as directed by du Pont, and

15 cont.

as under Items 1, 2, & 3 as to hauling. Measurement computed on basis of 3/4 predetermined capacity of carrier \$0.58 per C.Y.

16	10,000	10,040	Rock excavation in limited quarter 60' x 60' or more \$4.00 per C.Y.
17	0	37,305	Remove fence \$0.05 per ft.
18	0	2,119	Remove fence post \$0.10 each
19	0	408	Clearing trees less than 6" dia. \$0.75 each
20	0	91	Clearing trees more than 6" dia. \$1.50 each
21	0	227	Blasting post holes

(12) Reason for Award - LOWEST PRICE

(13) Scope of Work - FURNISHING LABOR AND EQUIPMENT FOR EXCAVATING AND GRADING PROJECTS 9753 & 58

(14) Change Orders and Unusual Items - FIELD CHANGE REQUEST NO. 1 IN THE AMOUNT OF \$217,905.24 TO COVER CONSTRUCTION OF ENTRANCE ROAD TO PLANT SITE, ADDITIONAL ROADS, DITCHES, EARTH AND ROCK EXCAVATION AS SHOWN IN PART (11a).

[REDACTED]

SUMMARY SUBCONTRACTS

- (1) Firm Name - JOHNSON & WILLARD
- (2) Address - 422 FRONT STREET, KNOXVILLE, TENN.
- (3) Work Performed - MAIN OFFICE BUILDING
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 253
- (6) Date subcontract awarded - FEBRUARY 23, 1943
- (7) Date subcontractor was scheduled to be complete - MARCH 24, 1943
- (8) Actual Starting Date - MARCH 4, 1943
- (9) Actual Completion Date - JUNE 23, 1943
- (10) Cost - \$28,937.65
- (11) Bid Tabulation
 - JOHNSON & WILLARD \$26,907.00
 - V. L. NICHOLSON CO. 26,988.00
 - EMORY CONSTRUCTION CO.. 29,724.00
- (12) Reason for Award - LOWEST PRICE
- (13) Scope of Work - FURNISH LABOR, MATERIAL AND EQUIPMENT FOR CONSTRUCTING MAIN OFFICE BLDG. 703-A. ELECTRICAL PIPING WORK AND EQUIPMENT NOT INCLUDED
- (14) Change Orders and Unusual Items
 - CHANGE ORDER NO. 1 IN THE AMOUNT OF \$4,000.00 ESTIMATE FOR PURCHASE OF CONCRETE AT \$16.00 PER CUBIC YARD
 - CHANGE ORDER NO. 2 IN THE AMOUNT OF \$1,423.40 ESTIMATE LABOR AND MATERIALS CONCRETE BLOCK FOUNDATION, BLDG. 719
 - CHANGE ORDER NO. 3 IN THE AMOUNT OF \$5,574.12 DECREASE
 - CHANGE ORDER NO. 4 IN THE AMOUNT OF \$181.37 FOR ADDITIONAL DOORS, WINDOWS, LINOLEUM, AND FOUNDATION DEPTH

SUMMARY SUBCONTRACT

- (1) Firm Name - BROADWAY MAINTENANCE CORPORATION
- (2) Address - 47-47 THIRTY-FIFTH ST., LONG ISLAND CITY, N. Y.
- (3) Work Performed - ELECTRICAL
- (4) Type of Contract - COST-PLUS-A-FIXED-FEE
- (5) XPO Number - 324
- (6) Date subcontract awarded - MARCH 2, 1943
- (7) Date subcontractor was scheduled to be complete - NOVEMBER 23, 1943
- (8) Actual Starting Date - MARCH 1, 1943
- (9) Actual Completion Date - MARCH 11, 1944 (ESTIMATE)
- (10) Cost - \$10,152.00
- (11) Bid Tabulation - (FIXED FEE BASED ON ESTIMATED COST)

BROADWAY MAINTENANCE CORPORATION.....	\$1,950.00
HATZELL & BUEHLER, INC.....	1,950.00
LORD ELECTRIC CO.....	3,500.00
TENNESSEE ARMATURE CO.....	6,200.00
MURPHY ELECTRIC CO.....	FAILED TO QUOTE
- (12) Reason for Award - TIE FOR LOWEST PRICE. CONTRACTOR ALREADY INSTALLED AT CLINTON ENGINEER WORKS.
- (13) Scope of Work - FURNISH ALL LABOR FOR INSTALLING OF ELECTRICAL SYSTEMS, LABOR FOR WHICH WAS ESTIMATED TO BE \$10,000.00
- (14) Special Orders and Unusual Items - SUPPLEMENTAL AGREEMENT

SUMMARY SUBCONTRACTS

- (1) Firm Name - WARNER ELEVATOR COMPANY
- (2) Address - CINCINNATI, OHIO
- (3) Work Performed - INSTALL ELEVATOR
- (4) Type of Contract - LUMP SUM
- (5) NPG Number - 397 $\frac{1}{2}$
- (6) Date subcontract awarded - MAY 4, 1943
- (7) Date subcontractor was scheduled to be complete - JULY 15, 1943 TENT.
- (8) Actual Starting Date - AUGUST 30, 1943
- (9) Actual Completion Date - OCTOBER 11, 1943
- (10) Cost - \$5228.52
- (11) Bid Tabulation

THE WARNER ELEVATOR CO.....	\$5,213.64
OTIS ELEVATOR CO.....	5,809.00
HAUGHTON ELEVATOR CO.....	6,914.00
- (12) Reason for Award - LOWEST PRICE
- (13) Scope of Work - FURNISHING AND INSTALLING ONE ELECTRIC 2000 $\frac{1}{2}$ ELEVATOR FOR BUILDING 601
- (14) Change Orders and Unusual Items - CHANGE ORDER NO. 1 IN THE AMOUNT OF \$14.88 FOR OVERTIME TO EXPEDITE INSTALLATION

SUMMARY SUBCONTRACTS

- (1) Firm Name - GRINNELL COMPANY, INC.
- (2) Address - PROVIDENCE, RHODE ISLAND
- (3) Work Performed - INSTALLATION OF SPRINKLER SYSTEM
- (4) Type of Contract - UNIT PRICE
- (5) XPG Number - 543 $\frac{1}{2}$
- (6) Date subcontract awarded - MAY 20, 1943
- (7) Date subcontractor was scheduled to be complete - JULY 15, 1943
- (8) Actual Starting Date - MAY 25, 1943
- (9) Actual Completion Date - FEBRUARY 17, 1944
- (10) Cost - \$11,625.00 (ESTIMATE)
- (11) Bid Tabulation

	MATERIAL	LABOR	EXPENSES
GRINNELL COMPANY, INC.	44% DISC.	50% DISC.	NET
BLAW-KNOX CONSTRUCTION CO.	42% DISC.	47% DISC.	10% ADDED
AUTOMATIC SPRINKLER CORP. OF AMERICA	43% DISC.	46% DISC.	15% ADDED
- (12) Reason for Award - LOWEST PRICE
- (13) Scope of Work - INSTALLING SPRINKLER SYSTEMS IN BLDGS.
706-A & 105
- (14) Change Orders and Unusual Items - CHANGE ORDER NO. 1 TO
COVER COST OF INSTALLING ADDITIONAL SPRINKLERS BLDG.
706-A FIRST ADDITION, AND OTHER MINOR CHANGES -
ESTIMATE \$9,000.00

SUMMARY SUBCONTRACTS

- (1) Firm Name - A. J. METLER
- (2) Address - KNOXVILLE, TENN.
- (3) Work Performed - HAULING (HAULING CONTRACT ONLY)
- (4) Type of Contract - UNIT PRICE
- (5) XPG Number - 456 & 740
- (6) Date subcontract awarded - FEBRUARY 25, 1943
- (7) Date subcontractor was scheduled to be complete -
DEPENDENT ON ARRIVAL OF MATERIALS
- (8) Actual Starting Date - FEBRUARY 25, 1943
- (9) Actual Completion Date - MARCH 15, 1944
- (10) Tons Hauled - APPROX. 26,090 TONS UP TO JANUARY 15, 1944
Tons Unloaded - APPROX. 18,545 TONS UP TO JANUARY 15, 1944
- (11) Bid Tabulation

A. J. METLER	HAULING . .	\$2.64 PER TON
WEBB'S TRANSFER LINE	HAULING . .	2.75 PER TON
KEITH WILLIAMS CO.	HAULING . .	2.80 PER TON
- (12) Reason for Award - LOWEST BIDDER
- (13) Scope of Work - FURNISH AUTOMOTIVE EQUIPMENT FOR HAULING
ALL TYPES OF MATERIALS & EQUIPMENT FROM HYINGTON,
TENN., TO THE PLANT SITE
- (14) Scope, Risks and Unusual Items - ALTERATION NO. 1 TO
COVER UNLOADING OF MATERIALS AT HYINGTON BY SUBCON-
TRACTOR AT 70¢ PER TON
ADDITIONAL PURCHASE ORDER NO. XPG 740 TO COVER
HAULING OF APPROXIMATELY 5000 TONS OF STONE AT 72¢
PER TON MILE - COST APPROX. \$5,990.25

SUMMARY SUBCONTRACT

- (1) Firm Name - ARMSTRONG CORN COMPANY
- (2) Address - 424 PRICHARD ST., ATLANTA, GA.
- (3) Work Performed - INSULATION
- (4) Type of Contract - UNIT PRICE
- (5) KPO Number - 7452
- (6) Date subcontract awarded - JUNE 20, 1943
- (7) Date subcontractor was scheduled to be complete - A.S.A.F.
- (8) Actual Starting Date - JULY 20, 1943
- (9) Actual Completion Date - MARCH 11, 1944 (ESTIMATE)
- (10) Cost - \$36,780.06 (ESTIMATE--SEE FINAL COST REPORT)
- (11) Bid Tabulation

ARMSTRONG CORN CO.....	\$13,874.50
NICELY CORPORATION.....	15,965.75
PHILLIP CAREY MFG. CO.....	18,632.19
- (12) Original Estimate - \$13,874.50
- (13) Reason for Award - LOWEST PRICE
- (14) Scope of Work - FURNISH LABOR, MATERIAL, TOOLS, ETC. TO INSULATE PIPING FOR PROJECTS 9733 & 58
- (15) Change Orders and Unusual Items

ALTERATION NO. 1 IN THE AMOUNT OF \$3,375.00 FOR ADDITIONAL PRICES FOR WOOLFELT AND HAIRFELT INSULATION

ALTERATION NO. 2 IN THE AMOUNT OF \$19,538.56 FOR INSULATION OF PIPING IN ADDITIONAL BLDGS. AND ADDITIONAL QUANTITIES FOR PREVIOUSLY ESTIMATED BLDGS.

SUMMARY SUBCONTRACTS

- (1) Firm Name - J. D. HELTON ROOFING COMPANY
- (2) Address - 1800 E. 18TH STREET, CHATTANOOGA, TENN.
- (3) Work Performed - ROOFING & WATERPROOFING
- (4) Type of Contract - LUMP SUM & UNIT PRICE
- (5) XPO Number - 927
- (6) Date subcontract awarded - APRIL 12, 1943
- (7) Date subcontractor was scheduled to be complete - JUNE 1, 1943
- (8) Actual Starting Date - APRIL 21, 1943
- (9) Actual Completion Date - FEBRUARY 7, 1944
- (10) Cost - \$25,143.23
- (11) Bid Tabulation

J. D. HELTON ROOFING CO. \$ 5,384.00
 TENNESSEE ROOFING CO. 7,237.00
 YOUNG ROOFING CO. 10,195.00

(11a) Original Estimate

LUMP SUM BIDS

101 Building.....727.40
 Guard Towers No. 614..... 20.00
 Clock Alley No. 701-A..... 60.00
 House No. 701-B..... 15.00
 House No. 707-A.....251.10
 House No. 707-B..... 50.00
 Garage No. 725.....153.00
 Total Lump Sum Bids.....\$1,985.50

UNIT PRICE BIDS

<u>TYPE</u>	<u>ORIGINAL BID</u>	<u>ACTUAL QUANTITY</u>	<u>UNIT PRICE</u>
SG-1C	14 sq.	47.35 sq.	\$10.00
SG-1W	8 sq.	225.0 sq	10.00
SM-1W	65 sq.	0	6.50

TYPE	ORIGINAL BID	ACTUAL QUANTITY	UNIT PRICE
Asph.	8 sq.	110.15 sq.	\$10.00
SM-SW Asph.	2 sq.	80.24 sq.	6.00
SM-SW	204 sq.	0	6.50
SM-WO	75 sq.	33.75 sq.	2.00
Asph. Shingles	88 sq.	938.60 sq.	8.50
Gravel Stop	3500 Lin. ft.	2517.83 ft.	.10
Flashing	500 Lin. ft.	1538.50 ft.	.30

Total Original Unit Price Bid \$3,398.50
Total Original Bid 5,384.00

(12) Reason for Award - LOWEST PRICE

(13) Scope of Work - ROOFING AND WATERPROOFING

(14) Change Orders and Unusual Items

CHANGE ORDER NO. 1 IN THE AMOUNT OF \$19,859.25 TO
INCLUDE WORK SHOWN ON ALTERATIONS 1, 2, 3.
ALTERATION NO. 1 - WATERPROOF 206 & 706 EQUIVALENT
FOUNDATIONS AND LAYING CORK IN BLDGS. 706 &
102. INCREASE OF \$2,954.00
ALTERATION NO. 2 - ADDITIONAL WATERPROOFING IN
101 & 205, ADDITIONAL ROOFS AND MISC. PARTS
INCREASE OF \$7,427.00
ALTERATION NO. 3 - WATERPROOFING CELL IN 105 BLDG.,
PATCHING MEMBRANE FOR 706-A TANK. INCREASE
OF \$2,140.00
ALTERATION NO. 4 - MEMBRANE FOR 6-50' TANKS AND 2-
25' TANKS FOR BLDG. 206, WATERPROOFING RESER-
VOIR, ADDITIONAL ROOFING QUANTITIES, ETC.
INCREASE OF \$7,405.00
ALTERATION NO. 5 - DECREASE AND INCREASE OF ROOFING
QUANTITIES. DECREASE OF \$166.77.

- (1) Firm Name - EMORY CONSTRUCTION CO., INC.
- (2) Address - KNOXVILLE, TENN.
- (3) Work Performed - MASONRY WORK
- (4) Type of Contract - LUMP SUM & UNIT PRICE
- (5) XPC Number - 1384
- (6) Date subcontract awarded - MAY 20, 1943
- (7) Date subcontractor was scheduled to be complete - AS REQUIRED
- (8) Actual Starting Date - MAY 25, 1943
- (9) Actual Completion Date - FEBRUARY 16, 1944
- (10) Cost - APPROX. \$20,569.48
- (11) Bid Tabulation

EMORY CONSTRUCTION CO., INC. \$11,216.75
 F. W. OWENS CO. 14,458.00
 JOHNSON & WILLARD 15,787.00
 JOHN B. KELLY, INC. REFUSED TO QUOTE

(11a) Original Estimate

LUMP SUM BIDS

Building No. 103 \$ 812.41
 Building No. 205 1,483.97
 Boiler House Bldg. No. 801 3,976.93

UNIT PRICE BIDS

<u>LINE</u>	<u>QTY</u>	<u>BID</u>	<u>ACTUAL</u>	<u>CLASS OF WORK</u>	<u>UNIT</u>
			<u>QUANTITY</u>		<u>PRICE</u>
1	50,000		63,592	12" Common brick fire walls	\$80.66/M
2	120'		116'	13" Terra Cotta coping for fire walls	0.69/ Lin. ft.

3	10,000	47,575	Common brick	\$101.00/M
4			Cutting holes for sleeves, pipes, etc. Holes less than 1 sq. ft. measured as 1 sq. ft.	
	10	0	In 8" walls	\$2.00/sq. ft.
	5	2.16	In 12" walls	\$3.00/sq. ft.
5			Bricking up openings out for beams, sleeves, pipes and similar items; moving of windows, doors and similar items to include any necessary toothing. Openings less than 1 sq. ft. shall be measured as 1 sq. ft.	
	10	22.17	In 8" walls	\$1.00/sq. ft.
	5	5.79	In 12" walls	\$3.00/sq. ft.
6			Bricking in openings over 6 sq. ft. including toothing. Price computed per M brick	
	100	0	8" x 12" x 12" Hollow Face Tile	\$0.404/sq. ft.
			Cutting holes for sleeves, pipes, etc. Holes less than 1 sq. ft. measured as 1 sq. ft.	
7		0	1 8" Walls	\$5.00/sq. ft.
8		31,967	Common brick in sanitary manholes	\$50.00/M
9	7000	32,282	Common brick in Process Manholes	\$55.00/M
	2000	5423		\$80.00/M
10	260 sq.ft.	0	Installing Acid Proof Brick Flooring (Acid proof brick and jointing materials supplies by du Pont	\$0.36/Sq. ft.

Total Unit Price Bid \$7239.80
Total Bid \$11,216.75

(12) Reason for Award - LOWEST PRICE

(13) Scope of Work - FURNISH LABOR MATERIALS, AND EQUIPMENT
FOR ALL PLANT BRICK AND MASONRY WORK

(14) Change Orders and Unusual Items

CHANGE ORDER NO. 1 IN THE AMOUNT OF \$2,324.21 TO
COVER ALTERATION NO. 1 - FURNISHING AND LAYING
STRUCTURAL TILE AND GLAZED BRICK IN BLDG. 105,
CONSTRUCTING 22 MANHOLE INVERTS, AND FURNISHING
AND LAYING TILE IN BLDG. 205.

CHANGE ORDER NO. 2 IN THE AMOUNT OF APPROX. \$9,343.75
TO COVER ALTERATION NOS. 2 & 3 - REPAIR WORK ON
BOILER FIRE BRICK, ADDITIONAL QUANTITIES TO
ORIGINAL ESTIMATE AS SHOWN IN PART (11a).
DECREASE IN SOME QUANTITIES

SUMMARY SUBCONTRACT

- (1) Firm Name - MCCABE CONSTRUCTION COMPANY
- (2) Address - CINCINNATI, OHIO
- (3) Work Performed - BOILER REPAIRS
- (4) Type of Contract - LUMP SUM
- (5) NPG Number - 1520
- (6) Date subcontract awarded - MAY 18, 1943
- (7) Date subcontractor was scheduled to be complete - JULY 31, 1943
- (8) Actual Starting Date - JUNE 10, 1943
- (9) Actual Completion Date - SEPTEMBER 8, 1943
- (10) Cost - \$17,019.99
- (11) Bid Tabulation

MCCABE CONSTRUCTION CO.....	\$15,650.00
THE RUST ENGINEERING CO.....	17,885.00
ALBERT DOAK CO.....	19,000.00
FLEISCHER-SIEGHER.....	19,402.00
BALLARD-SPRAGUE.....	21,423.00
FISHER-HALLIDAY.....	REFUSED TO QUOTE

- (12) Reason for Award - LOWEST PRICE
- (13) Basis of Bid - FURNISH LABOR AND MATERIALS FOR (2) ASH PITS IN BLDG. 801
- (14) Basis of Bid and Unusual Items - CHANGE ORDER NO. 1 AMOUNT OF \$1,369.99 TO COVER REV. 1 TO 3, EXCESS ASH PITS, DELAY TO CONTRACTOR, OVERTIME, TRAVELING TIME, ETC.

LIBRARY SUBJECTS

- (1) Firm Name - YOUNG & BENTKE
- (2) Address - 1040 HULBERT AVE., CINCINNATI, OHIO
- (3) Work Performed - DUCT WORK
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 2003
- (6) Date subcontract awarded - JUNE 25, 1943
- (7) Date subcontractor was scheduled to be complete - OCTOBER 1, 1943
- (8) Actual Starting Date - AUGUST 23, 1943
- (9) Actual Completion Date - SEPTEMBER 30, 1943
- (10) Cost - 27,743.00
- (11) Bid Tabulation

YOUNG AND BENTKE.....	27,743.00
CARRIER CORPORATION.....	7,750.00
LIBERTY ENG. & MFG. CO.....	14,800.00
- (12) Reason for Award - LOWEST PRICE
- (13) Scope of Work - FURNISHING, FABRICATING & INSTALLING DUCT WORK IN BLDG. 205
- (14) Change Orders and Unusual Items - NONE

SUMMARY SUBCONTRACTS

- (1) **Firm Name** - O'NEILL DETERMINATING COMPANY
- (2) **Address** - KNOXVILLE, TENN.
- (3) **Work Performed** - DETERMINATING
- (4) **Type of Contract** - LEASE
- (5) **XPO Number** - 2373
- (6) **Date subcontract awarded** - JUNE 24, 1943
- (7) **Date subcontractor was scheduled to be complete** - JUNE 24, 1943
- (8) **Actual Starting Date** - JUNE 24, 1943
- (9) **Actual Completion Date** - JUNE 24, 1943
- (10) **Cost** - \$75.00
- (11) **Bid Tabulation**
O'NEILL DETERMINATING COMPANY.....\$75.00
- (12) **Reason for Award** - TO EXPEDITIOUS PROCUREMENT
- (13) **Scope of Work** - FURNISH MATERIALS & LABOR BE USED TO FUMIGATE THE TC-4 RECEIVING AND STORAGE BLDG.
- (14) **Change Orders and Unusual Items** - NONE

SUMMARY SUBCONTRACTS

- (1) Firm Name - CHATTANOOGA BOILER & TANK COMPANY
- (2) Address - CHATTANOOGA, TENN.
- (3) Work Performed - BOILER REPAIR
- (4) Type of Contract - LUMP SUM
- (5) XPG Number - 3037
- (6) Date subcontract awarded - AUGUST 12, 1943
- (7) Date subcontractor was scheduled to be complete - A.S.A.P.
- (8) Actual Starting Date - AUGUST 14, 1943
- (9) Actual Completion Date - SEPTEMBER 1, 1943
- (10) Cost - \$1006.86
- (11) Bid Tabulation
CHATTANOOGA BOILER & TANK CO.....\$1006.86
- (12) Reason for Award - TO EXPEDITE REPAIRS & PROCUREMENT OF MATERIALS
- (13) Scope of Work - FURNISH LABOR, MATERIAL & EQUIPMENT TO REPAIR TEMPORARY BOILER TC-47
- (14) Change Orders and Unusual Items - NONE

SUMMARY SUBCONTRACTS

- (1) **Firm Name - COMBUSTION ENGINEERING COMPANY**
- (2) **Address - CHATTANOOGA, TENN.**
- (3) **Work Performed - BOILER MAINT**
- (4) **Type of Contract - LTF SUB**
- (5) **XFC Number - 3230**
- (6) **Date subcontract awarded - AUGUST 7, 1943**
- (7) **Date subcontractor was scheduled to be complete - AUGUST 8, 1943**
- (8) **Actual Starting Date - AUGUST 7, 1943**
- (9) **Actual Completion Date - AUGUST 8, 1943**
- (10) **Cost - \$182.00**
- (11) **Bid Tabulation**
COMBUSTION ENGINEERING CO.....\$182.00
- (12) **Reason for Award - TO EXPEDITE REPAIRS**
- (13) **Scope of Work - FURNISH LABOR ONLY TO REMOVE & RE-INSTALL TWO BOILER TUBES FOR BLDG. 801**
- (14) **Change Orders and Unusual Items - NONE**

General

The construction used on this project varied in type according to the area. The 10 and 20 process areas and a portion of the 500 and 600 services & facilities and 800 service area were of permanent construction; while the entire 700 service area and balance of the above-mentioned areas were of a semi-permanent construction, durable for a five to ten year period. Most of the process buildings were a heterogeneous mixture of architecture and building materials, as they were primarily designed for suitability to the equipment housed therein rather than for a continuity of architecture with the rest of the plant. In some cases, the building structure was so constructed to act as part of the equipment. The loss of time prohibited the use of critical building materials, thus affecting standard building design and construction.

1. Foundations

There were several distinctive types of building and equipment foundations of which one or two types were used in all buildings, such as reinforced and plain concrete curtain walls, reinforced and plain concrete walls with spread footings, reinforced concrete piers and beams, reinforced and plain concrete slabs, reinforced concrete piers with spread footings, and concrete block on concrete spread footings. The type used depended upon soil bearing conditions in the field and design required, which varied from 2500 pounds to 6000 pounds per square foot. Exterior walls were carried three feet below finished grade or to a one foot minimum in undisturbed soil. Concrete used in all foundations, walls, roofs, and floors was required to develop a strength of 2500 pounds per square inch at 28 days.

2. Floors

The ground floor in all buildings was made up of either 4" reinforced or plain concrete slabs with the exception of 703 Administration Building and 719 First Aid & Hospital Building, floors of which were composed of 1" T & G single pine strip flooring. No. 9 and No. 11 expanded metal "steel-crete" reinforcing was used for ground floor slabs wherever specified and deformed reinforcing bars were used for floor slabs. Reinforced second floor concrete floor slabs were confined to 801 Boiler House, 105 Pile Building, and two units at 703 Administration Building. Concrete floor finishes were hard troweled, smear troweled, float and burlap finish. Pine flooring, 2" T & G, was used in 105 Pile Building, 706-A and 706-C Laboratories, 807 Water Treatment House, and Old Filter Plant. Battleship linoleum was used for floor covering in medical section of 719 Building and in all wood-floored janitor's closets and toilet rooms, and in corridors of 703 Administration Building. Mastic tile, acid brick and poured mastic floor coverings were used in special laboratories and acid mixing rooms to protect concrete sub-floors.

3. Framing

All structural lumber used in roof and building was 1 1/2" dense short leaf yellow pine having a fibre-stress of at least 1200 pounds. All other material such as wall plates, studs, bridging, door bucks, rafters, ceiling strips and joists, having a fibre-stress of at least 900 pounds. Good sheathing, decking, and drop siding was also clear yellow pine. Built-up gabled and shed roof truss construction was used in the construction of the 111 room shop, 706-1 and 706-2 Laboratories, 708 Cafeteria Building, 717-1 and 717-2 shops, and 801 Boiler House. Split ring timber connectors and bolts were used in all truss construction. Post and girder construction was used to support the second floor of two-story buildings and to support single story flat and shed roof structures where supporting partitions were omitted. Good foundation plates 3" thick were secured to concrete foundations by anchor bolts. 2" x 6" studding set on 24" centers was used for outside walls and main supporting partitions of all buildings with the exception of smaller structures such as Change Houses, Clock Alley, Laundry, etc. Studding and headers were doubled around all openings and tripled at all corners. Top ceiling plates were doubled to support dead weight thrust of roofs. Floor joists were 2" x 10" and 2" x 12" set on 16" centers, doubled under partitions, with solid bridging between. Ceiling joists were mainly 2" x 6" supported by knee braces from above rafters. Rafters varied from 2" x 6" to 2" x 12", depending upon size of structure. The larger gabled roofs were supported by a center post, collar beams, and additional bracing.

4. Siding

The outside of all buildings was covered with 1" T & G decking and drop siding, pattern 105, having black building insulation between, with exception of the 801 Boiler House Building which was covered with corrugated transite fastened to wooden girts bolted to the structural steel framework and the 103 Tile Building which was secured in like manner and sided with 2" T & G metal-covered insulated siding, a product of the Robertson Company known as " " siding. Building and partition lining was mainly 1/2" rock board with the exception of the 103 Building and the toilet rooms in 703, 707-A, and 707-B Buildings where 1/2" fibre board was used. Gypsum board ceiling 3/8" thick was used throughout, 1" fibracoustic strip board was used in special laboratories as noted in building summary sheets, and all explosion-proof laboratories were ceiled and lined with 1" fibracoustic tile board 12" square cemented to concrete walls and ceilings.

The doors used on this project were all wood with the exception of two sliding fire doors installed in Building 706-1. The type of doors used are as follows: single and double swing, double panel doors; single and double swing, 4-light single panel doors; single and double swing, 6-light single panel doors; double swing and sliding 8-light and double panel doors; single swing panel and louvre doors; and single swing 4 and 6-light louvre doors. The use of double panel doors was confined to inside openings. The single doors varied in size from 2' 6" x 7' 0" to 4' 0" x 7' 0" and double doors varied in size from 6' 0" x 8' 0" to 10' 0" x 10' 0".

The window frames and sash in all buildings were likewise wooden throughout and frames were equipped with "jiffy" spring balances. Spring roller cloth window shades were provided at all office and laboratory windows. Glass for doors and windows was single strength "B" quality clear except for toilet and shower room windows which were obscure glass. Three standard types of windows were used: single and double 6 and 8-light pivoted single, double and triple sash windows; single and double frame, 6 and 8-light double hung windows; and 4-light single casement sash windows. Screens were provided for outside doors and windows and storm sash were installed on windows of all air conditioned rooms.

Inside and outside stairways were open wood, 3' 0" minimum width, having 12" treads and 7½" risers.

5. Roofs

Three general types of roofs were used, with a combination of two or more used in the construction of each building. Gable and hipped roofs varying in pitch from 2 on 12 to 6 on 12, and shed roofs varying from 1 on 12 to 6 on 12, and flat roofs varying up to 1 on 20. Roof projections were minimized to 3", allowing only for a fascia board finish along the rake of the rafters and eaves. All gable roofs and shed roofs with pitches from 3 on 6 to 6 on 12 were covered with asphalt 3 in 1 strip shingles, 210 pounds per square, with the exception of 106 Building, which had a G.M. roofing, and 105-B Building, which was covered with asphalt roll roofing. The flat and gradual sloping roofs were covered with Built-Up roofing, some having gravel surfaces and others smooth surfaces.

6. Ventilation

Some form of ventilation was provided in most buildings. A.C.M. ventilators with and without motors, sheet metal ventilators, and wooden ventilators were installed in roofs where gable louvers and exhaust fans were not provided. The cafeteria was provided with ceiling fans and most offices were provided with 12" and 16" oscillating fans. Fume exhaust systems with hoods were installed in chemical laboratories. Air conditioning was provided in laboratories requiring constant working temperatures.

The drainage used on this project is divided into two systems, sanitary and process drainage, the first of which exists within approximately 90% of the buildings as noted on the following "Summary Building Data" sheets. Process drainage is restricted primarily to the process area buildings and pertinent laboratories. All sanitary, soil, and waste piping laid underground was cast iron bell and spigot pipe or vitrified clay pipe. All sanitary, waste, and vent piping under 2" in size was cast iron threaded pipe and fittings, and lines 2" and over were cast iron bell and spigot pipe and fittings.

Josam floor drains were used extensively in all buildings and

Four general types of fixtures were installed: incandescent "solar" ceiling fixtures in offices; open incandescent light fixtures with shallow dome reflectors in service buildings, outside building lighting, and non-operating areas; clear and colored vapor fluorescent light fixtures in process work areas, laboratories, shops, kits, and some outside building lights; and fluorescent 40w, 8 tube, fixtures in laboratories. Lamps varied in size from 100 to 300 watts.

All lighting circuits were fused and connected to a main lighting panel and safety switch. Lighting service was 110 V, A.C., single phase, 60 cycle. Eight emergency gasoline driven generator sets, 110 V, A.C., single phase, 60 cycle, varying in size from 3 KW to 10 KW, were installed and separately housed in individual structures near the 105, 205, 706-A, 706-B, 706-C, 717-B, and 719 Buildings.

11. Power

Totally enclosed power wiring in black steel rigid conduit was used from building service heads to the equipment. Immersed cubical starters and push-button stations were used only for motors requiring 2300 V, 3 phase, 60 cycle power. Quick-make and break across the line starters were used for motors less than 3/4 horsepower. Magnetic air break starters were used for 3/4 horsepower motors and above, requiring 230 V or 480 V, 3 phase, 60 cycle power. Most laboratories and process buildings were also provided with 125 V, D.C., power supplied by electric driven generator and balance sets which were installed in these buildings. Wire used for 220/440 V power varied in type and size from No. 12 solid, 600 V, type R, to No. 2/0 stranded, 600 V, type RP. Wire used for 2300 V power varied in size from 1/0 to 4/0 stranded, 3000 - 5000 V, type HP. Low resistant galvanized iron wire and copper buss bars were used for grounding all equipment in accordance with National Electric Code and du Pont standards.

12. Painting

The painting was minimized to the extent that all exterior wood siding was given only one coat of gray oil shingle stain, while sash, doors, and trim were given one prime coat and a finish coat of white paint. Exterior and interior light gauge sheet metal and interior structural steel, and miscellaneous iron work, including steel columns, beams, and plates, were painted with one coat light stone gray. The walls and ceilings of the area in Building 708 and doctor's office, nurse's office, and nurse's laboratory in Building 719 were painted with a gloss finish; likewise, the walls and ceilings of toilet and shower rooms in all buildings were painted in the same manner. Code painting of pipes was done where it was judged necessary for safety and maintenance.

13. Field Change Requests

During the course of construction, requests were made by Clinton Laboratories for work involving building additions,

[REDACTED]

major design changes, and basic process changes not specified by the Design Division. The Field Project Manager decided [REDACTED] change requested could be made. In the event that [REDACTED] could not be performed, the request was re- [REDACTED] Laboratories stating the reason. If the [REDACTED] request was approved, the Cost Department assigned [REDACTED] Number. These numbers were so assigned as to designate the area involved and the construction number of the request; for example, the first request for work in the 100 Process Area was designated as 100-1, the second request as 100-2. Similar requests for the other areas were numbered in the same manner, with the first number designating the area.

Upon approval of the request by the Field Project Manager and assignment thereon of a Work Order Number, four copies of the Field Change Request Form, signed by the Clinton Laboratories' Director or delegate, Contracting Officer, TNX Area, Clinton Engineer Works, and the Construction Field Project Manager, was forwarded to F. B. Burns, Control Manager, Explosives Department-TNX. If approved by the Explosives Department-TNX, three copies were signed and forwarded to the [REDACTED] Project Manager who, in turn, approved or rejected and, if approved, submitted two copies to the Wilmington Area [REDACTED]. The Area Engineer retained one copy and returned one [REDACTED] to the Design Project Manager. The Design Project Manager advised the Field Project Manager by teletype of approval [REDACTED] objections received.

All labor and materials required in the performance of a "C" Work Order was charged to the regular cost code involved and not to the "C" Work Order. When the work was completed, the Division Engineer for the area in which the work was performed informed the Cost Department, and also advised if the work had been done in general accordance with the estimate previously made and that the cost was essentially the same as originally estimated. If a general change in cost was indicated, a revised estimate was made and the accumulative total carried on later field changes issued was corrected, covering the amount of increase or decrease due to the revised estimate.

A total of 35 Field Change Requests were issued by Clinton Laboratories [REDACTED] March 15, 1944, of which 22 were performed [REDACTED] at a cost of approximately \$34,058. [REDACTED] Change Requests completed is enclosed within [REDACTED] unauthorized balance of Field Change Requests [REDACTED] or partially by Plant Work Orders issued by [REDACTED] and by additions to the original project requested by the Design Division.

Field Change Request C-700-17 was issued to cover the labor and material expenditure totaling \$18,139 for moving and making repairs to temporary construction buildings transferred to Clinton Laboratories as listed on the following pages. The above costs did not include the transfer value of these buildings nor the value of 10 additional buildings and facilities which were also

transferred and did not require any expenditures of labor or materials. The total transfer cost of all buildings was approximately \$181,701.25, as shown on the following page to Permanent Building Accounts".

**CLINTON ENGINEER WORKS
PROJECTS 9733 & 58
FIELD CHANGE REQUEST
C-700-17**

PRESENT BLDG. NO., NAME, & LOCATION **NEW BLDG. NAME, & LOCATION**

TC-4B
Receiving Warehouse
SW Cor. - N-21770
E-30075

713-E
Stores
SW Cor. - N-21630
E-30390

- WORK TO BE DONE**
1. Remove all shelves and bins.
 2. Remove toilet on N-W corner of building.
 3. Heating (coal stoves) to remain as is.
 4. Lighting to remain as is.
 5. Apply two coats of gray paint to exterior.

TC-4A
Receiving Office
SW Cor. - N-21770
E-30075

717-F
Utility Shop
SW Cor. - N-21315
E-30390

1. Relocate as indicated by coordinates. Coordinates are at S-W corner of building in each case. Orient so that door is facing west.
2. Remove toilet room.
3. Replace fluorescent lights with incandescent lights.
4. Remove present steam heating facilities, and install a coal stove.
5. Apply two coats of gray paint to exterior.

TC-4C
Stores and Tool Room
SW Cor. - N-21745
E-30210

717-E
Salvage Shop & Store
SW Cor. - N-21475
E-30175

1. Relocate building as indicated (coordinates are at S-W corner in each case). Building is to be oriented at new location, so that the door now facing north will face south into the Salvage Yard.
2. Install 3' x 7' door on north side directly opposite the present sliding door.
3. Bins and shelves to remain as is.
4. Heating to remain as is.
5. Lighting to remain as is.
6. Apply two coats of gray paint to exterior.

TC-9
Millwright Shop
SW Cor. - N-21745
E-30450

713-C
Stores
- N-21745
E-30450

TC-12
Electric Shop
NE Cor. - N-21735
E-30345

713-D
Stores
NE Cor. - N-21735
E-30333

TC-19
Garage
SW Cor. - N-21611
E-30570

725-B
Garage
SW Cor. - N-21611
E-30570

1. Remove 26' x 63' open shed on north side.
2. Remove 7' x 10' Generator Shed and 18' x 30' Welding and Blacksmith Shop on west end.
3. Remove 10' x 22' addition to Office on west end, and replace east wall of Office. This wall was removed when addition was made.
4. Remove compressor shed on south side.
5. Remove handrail enclosure in N-E corner of Shop.
6. Install double doors on 10' x 7' opening at west end of Shop.
7. Enlarge 3' x 7' opening between Shop and Office to 6' x 7'. No door to be installed on this opening.
8. Remove coal stove in west end of Shop. Other stoves to remain.
9. Lighting to remain as is.
10. Apply two coats of gray paint to exterior.
11. Cover present sheathing with building paper and siding.

1. Move building 12 feet west, as indicated by the coordinates, in order to maintain proper distance between buildings.
2. Provide more substantial footings than present ones.
3. Remove all partitions and bins.
4. Remove heating stoves.
5. Lighting to remain as is.
6. Apply two coats of gray paint to exterior.
7. Cover present sheathing with building paper and siding.

1. Remove all benches and lockers.
2. Remove stoves to remain as is.
3. Lighting to remain as is.
4. Apply two coats of gray paint to exterior.
5. Remove fuel oil pumps and storage tanks. Tanks to remain intact in present location.

TC-21
Pay Booth
SW Cor. - N-21748
E-29999

710
Pay Booth
- N-22132
E-30078

TC-39
First Aid Bldg. Nquipt. First Aid & Hospital
SW Cor. - N-21825.5
E-29935.0

719-E

TC-52
101 Change House
SW Cor. - N-22563.5
E-31412.0

707-D
Change House
SW Cor. - N-22563.5
E-31412.0

6. Cover present sheathing with building paper and siding.

1. Relocate as indicated by coordinates. Coordinates are at S-W corner of building in each case.
2. Provide steam heat.
3. Provide electric lights.
4. Apply two coats gray paint outside.
5. Cover present sheathing with building paper and siding.

1. First Aid equipment to be transferred to Bldg. 719.
2. No other work required.

1. Dismantle entire north half of building.
2. Remove storage room on S-E corner of building.
3. Remove the two center rows of lockers and lockers in S-W corner.
4. Install lunch table.
5. Remove present coal-fired water heater south of building, and provide steam type heater similar to those elsewhere on plant. This heater to be inside of building (see Item 6).
6. Remodel Shower and Locker Rooms to include following:
2 lavatories 2 water closets 1 slop sink
1 shower 1 urinal 1 water heater
7. Install three windows in north wall of Locker Room.
8. Provide steam heat.
9. [REDACTED] remain as is.
10. Apply two coats of paint to exterior of building.
11. [REDACTED] sheathing with building paper and [REDACTED]

TC-54
Construction Office
100 Area
SW Cor. - N-2251E
E-2151E

704-A
Supervisors' Office
SW Cor. - N-2259
E-3079E

TC-61
Safety Office
SW Cor. - N-21794.5
E-30618.6

729
Stores
SW Cor. - N-21794.5
E-30618.6

TC-63
Ration Bldg.
SW Cor. - N-22050
E-30632

717-D
Riggers' Loft
SW Cor. - N-21638
E-30206

1. Relocate building as indicated by coordinates. Coordinates are at S-W corner of building in each case.
2. Provide substantial underpinning.
3. Cover exterior walls with drop siding.
4. Provide steam heat.
5. Check and make necessary repairs to electrical wiring.
6. Provide 110 volt outlets in all offices except S-E office.
7. Remove south door and close opening.
8. Install door on opening between west and center offices.
9. Provide lock for outside d.p.r.
10. Provide wash basin in S-E office.
11. Put ceiling in entire building.
12. Apply two coats of paint outside and inside.

1. Remove all heating stoves.
2. Lighting to remain as is.
3. Apply two coats of gray paint to exterior.
4. Cover present sheathing with building paper and siding.

1. Relocate as indicated by coordinates. Coordinates are at S-W corner of building in each case. Orient so that present north side will face west.
2. Remove partition.
3. Remove counter and shelves.
4. Remove present heating facilities (steam), and install coal stove.
5. Lighting to remain as is.
6. Factory as is.

TC-64
Excess Materials Office
SW Cor. - N-21650
E-29934

TC-308
Mech. Experimental
SW Cor. - N-22168
E-30288

TC-713
Stores
SW Cor. - N-21900
E-30550

704-B
Construction Office
able

717-C
Shops
SW Cor. - N-22168
E-30288

713-B
Stores
Present Location

1. Move to temporary location west of operations' Salvage Yard
2. Heating (electrical) to remain as is.
3. Lighting to remain as is.
4. Apply two coats gray paint to exterior.

1. Remove 5' x 4½' x 38½' concrete equipment foundation, and smooth floor to level of shop floor.
2. Remove shower from change room on west side of building.
3. Remove coal-fired water heater used in conjunction with change room.

1. Remove wire screen partition in east end of building.
2. Cover exterior walls with drop siding.
3. Revise lighting system so that outside and inside lights will be on separate switches.
4. No heating required.
5. Apply two coats of gray paint to exterior.


CLINTON ENGINEER CRKS
PROJECTS 9733 & 58
TRANSFER OF COSTS TO
ITEMIZED BUILDINGS

TRANSFER COST	NAME	PARLAMENT BLDG., NO.	TRANSFERRED COST
TC-3	Millwright Office	713-G	\$ 350.00
TC-3	Elect. Office	717-H	350.00
TC-3	100 Area Div. Eng. Office	717-I	1,180.00
TC-4	Regg. Office	717-F	1,710.00
TC-4	Stores & Tool Room	717-E	4,950.00
TC-4	Regg. Warehouse	713-E	5,050.00
TC-8	Carpenter Shop	713-D	2,700.00
TC-9	Millwright Shop	713-C	7,425.00
TC-12	Electric Shop	713-F	2,300.00
TC-14	Riggers Loft	717-G	2,200.00
TC-15	Electric Lines	501	
TC-15	Water Lines	625	
TC-15	Sewers	625	
TC-19	Garage	725-B	
TC-27	Parking Lot	613	
TC-30	Pipe Shop	713-H	
TC-34	Pistol Range	745	
TC-47	T.C. Boiler Facilities	625-C	350.00
TC-58	Const. Office	703-B	50,411.92
TC-59	Medical Wing	703-B	20,406.11
TC-61	Safety Office	729	2,500.00
TC-63	Ration Building	717-D	1,150.00
TC-64	Excess Mat. Office	704-B	1,135.00
MR-181 & 184	Water Tank & Boiler	625-C	1,250.00
ST	2 - Gas Tanks & Storage Tanks	725-B	275.00
101	Office	704-A	15,840.00
101	Change House	707-D	1,725.00
101	Storage Building	715	8,900.00
305	Mech. Exp. Building	717-C	24,000.00
		TOTAL	\$181,701.26

CLINTON ENGINEER WORKS
PROJECTS 9733 & 50

LIST OF FIELD CHANGE REQUESTS

<u>ORDER NO.</u>	<u>DATE</u>	<u>NO.</u>	<u>DESCRIPTION OF WORK</u>	<u>COST</u>
C-100-1		103	waterproofing vault floor	\$ 750.00
C-700-4		720	Added wash rack for fire hose	284.00
C-200-1		203	Painting pipe gallery tunnel	1,070.00
C-700-5		703	Change partitions and doors	390.00
C-700-10		703	Additional doors, steps, etc. to 703 bldg. addition	307.00
C-700-12		703	Sound proofing rooms, etc., in 703 bldg. addition	931.00
C-100-2		103	Ad ed two steel ladders	144.00
C-100-3		103	Furniture Women's lounge	437.00
C-100-4		103	Install gas & air lines to benches	323.00
C-800-1		807	Added tanks, agitator, pump, etc.	121.00
C-100-5		103	Added curb around top of barricade	25.00
C-600-1		632	Screens for White Oak Creek Dam	10.00
C-100-6		103	Extended platform	724.00
C-100-7		103	Added drip pans for ventilators	151.00
C-100-8		103	Added two steam coils	500.00
C-100-9		103	Protection of piping	109.00
C-700-13		720	Partition change for fire truck	470.00
C-100-10		103	Rearrange test box & piping and build lead wall	3,725.00
C-100-11		103	Install bulkhead in canal	500.00
C-200-2		203	Install 2" s/s line from pump to room C	149.00
C-700-16		703	Run row water line	1,755.00
C-700-17		703	Remodeling T.C. Buildings	18,139.00
				<u>\$34,058.00</u>

-D, 713-B, 713-C, 713-D, 713-E, 713 (Temp.),

717-A, 717-B, 717-F, 717-G, 717-H, 717-I, 725-B, 729.

C Plant Work Orders

Clinton Laboratories, the organization holding the prime contract for the construction of the TNX area constructed by du Pont, requested from time to time certain detail work to be performed by the construction, clerical, mechanical, and labor forces. In the beginning, this work was confined mainly to accounting, traffic, timekeeping, and receiving; but Plant Work Orders were later issued covering all phases of construction work in which material or labor, or both, was furnished by du Pont in the performance of specified work not required by design.

From a standpoint of economy, it was necessary that du Pont furnish Clinton Laboratories with these services. Some of these services were temporary in nature; others were performed during the entire period that du Pont was actively engaged in construction on the plant site.

In order to eliminate all unnecessary amount of clerical work in connection with the charges to be made to Clinton Laboratories for these services, it was anticipated that all work performed by du Pont was to be charged to a Production Work Order Account. These amounts were journalized by du Pont in order to relieve their records. Clinton Laboratories also journalized these charges as a service from du Pont in order to set up, on their records, credits made for their accounts by du Pont. Copies of the Journal Vouchers were forwarded to the Government accountant in order for reimbursements to be made to du Pont, and in order that the best records of the two organizations could be adjusted for these services.

A total of 172 Plant Work Orders, in the amount of approximately \$17,928.69, were issued by Clinton Laboratories and performed by du Pont construction forces up to March 15, 1944.

Plant Work Orders were prepared by Clinton Laboratories' Chief Clerk and forwarded in sufficient numbers to the Construction Assistant Field Project Manager for approval. Upon approval by the Assistant Field Project Manager, all copies were forwarded to the Cost and Contract Department for the assignment of a Plant Work Order Number and distributed to the field. A signed copy was returned to the Chief Clerk of Clinton Laboratories indicating that the work was accepted and would be performed by the construction forces. All work performed was charged to the P.W.O. Number. P.W.O. numbers were assigned to various departments and was continuous from month to month. All repairs and maintenance was charged to the same P.W.O. number but each job was designated by a sub-number.

D Construction Work Orders

Construction Work Orders were issued for work to be performed by Clinton Laboratories for the du Pont Field Forces engaged in the construction of the TNX area. Requests of this type were issued

only in special cases when it was found that construction did not have men classified on their rolls to perform work indicated by design or were unable to perform all of the work as the building had been placed in operation or had to be done at a specified structure when construction men were not available.

Only 25 Construction Work Orders were issued up to March 15, 1944. The majority of these were for overhead electric work as construction had previously terminated their line crew as the balance of the work did not warrant a full-time organization of this type.

At the close of field construction work, Construction Work Orders were written to cover all uncompleted work and uncompleted design changes issued since the start-up of the process areas. General Work Orders were likewise issued for services such as: receiving, timekeeping, accounting, traffic, etc., in order to minimize construction overhead in closing out this project.

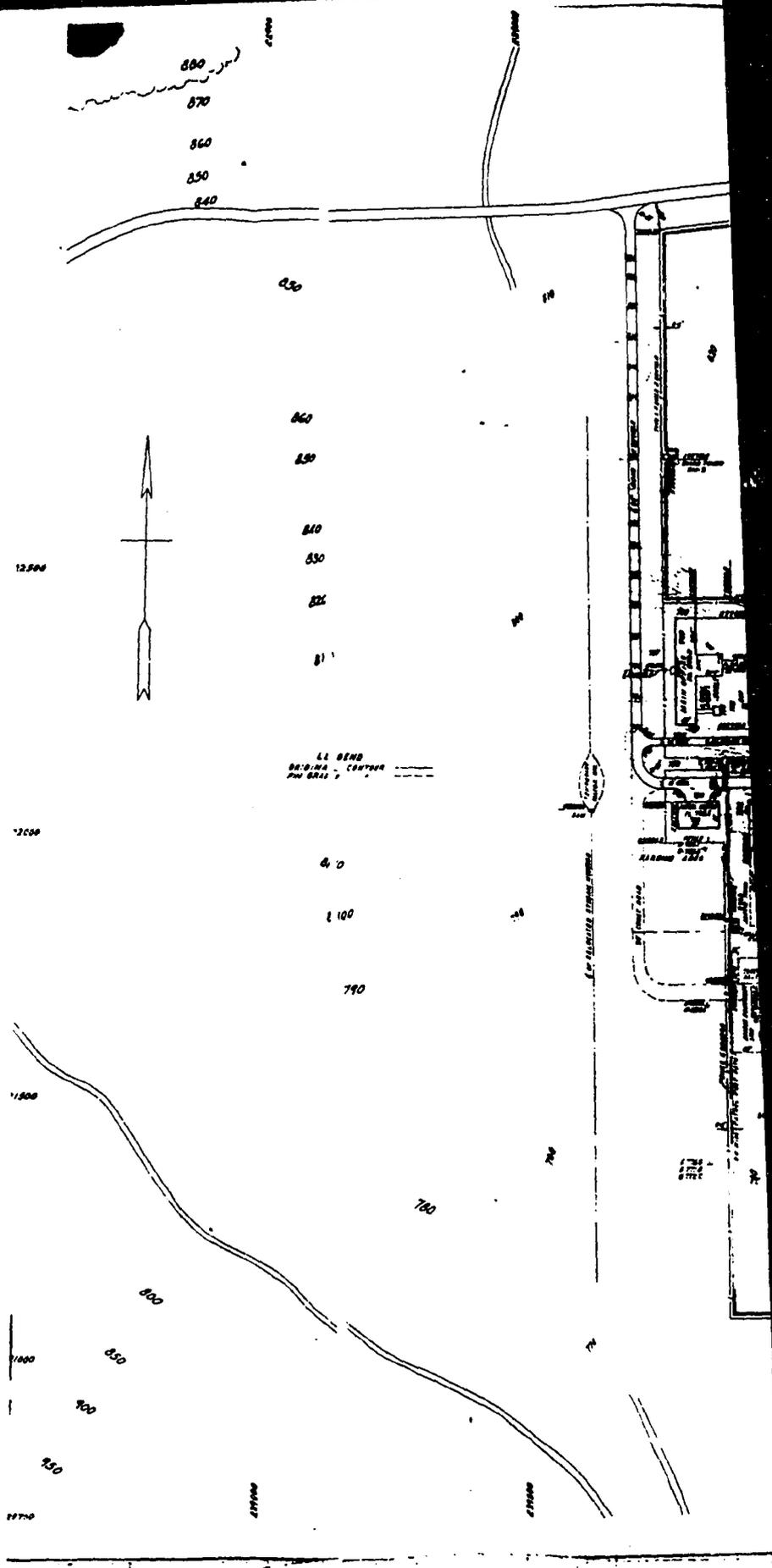
Requests by Construction were listed on regular Repair Order Form No. 188 and sent in quadruplicate to the Works Engineer, Department for approval, having received proper construction approval of the Field Superintendent or the Cost and Contract Engineer. When approved by the Works Engineer or the Project Engineer, the order was forwarded to the Accounting Department where a Work Order Number was assigned, having a prefix letter. These were numbered consecutively for each request, starting with No. 1. Three copies were then sent to the Repair Order Clerk of the Maintenance Department and the fourth copy was returned to the Cost and Contract Engineer, Construction Department. Labor and material cost for individual jobs were accumulated in the same manner as costs for projects.

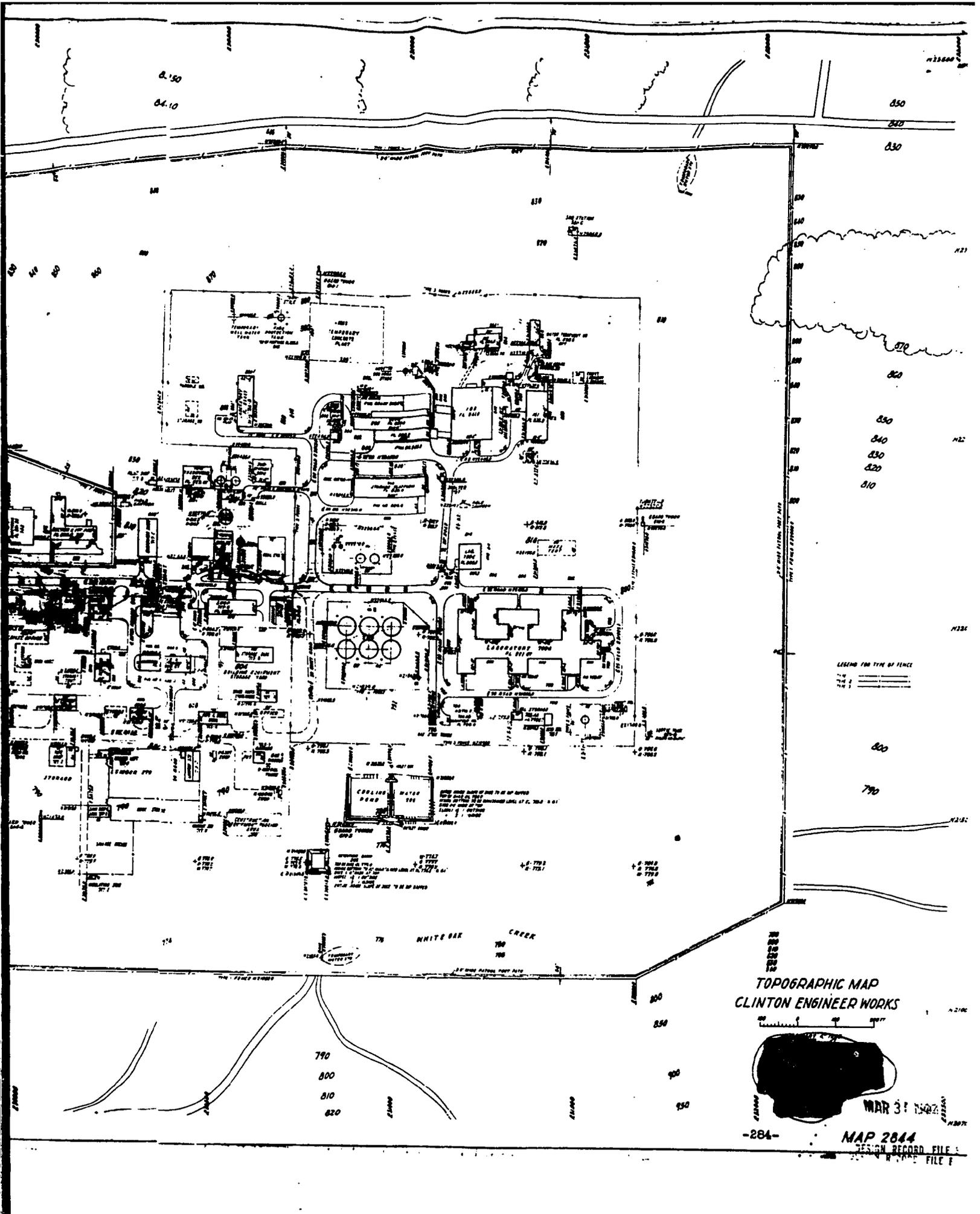
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**CLINTON ENGINEER WORKS
PROJECTS 9733 & 58
PERMANENT BUILDING LIST**

<u>Bldg. No.</u>	<u>Name</u>	<u>Former Bldg. No.</u>
101	Process Area Shops	
102	Instrument Storage Bldg. & Office	
103	Process Area Vault	
105	Pile Building	
105-E	Carburizer Bldg. & Storage Bldgs.	
115	Exhauster Building	
204	Exhaust Gas Laboratory	
205	Separation Building	
206	Process Area Tank Farm	
305	Experimental Construction Bldg.	
501	Electric Substation and O.S. Wiring	
603	Roads and Walks	
604	Autos and Trucks and Cranes	
605	Fences	
613	Permanent Parking Area	
614	Guard Towers	
615	Fence Lighting	
622	Overhead Steam	
623	Underground Water	
624	Air Lines	
625	Sewers and Septic Tanks	
625-C	Sanitary Boiler	
628	Process	
630	Fire Protection	
631	O.S. - O.H. Line - Supports	
632	Dam and Sluice Gate	
701-A	Gate House and Clock Alleys	
701-B	Gate House	
702	Telephone and Fire Alarm System	
703-A	Main Office Building	
703-B	Main Office Overflow Bldg.	
704-A	200 Area Supervisors Office Bldg.	TC-58 & 59
704-B	Construction Office Bldg.	TC-54
706-A	Laboratory	TC-64
706-B	Laboratory	
706-C	Warehouse	
706-D	Manifold House	
706-E	Laboratory	
706-F	House	
706-G	House	
707-AA	Change House	
707-C	Change House	
707-D	Change House	
708	Cafeteria	TC-52
713-A	General Storehouse	
713-B	General Storehouse	
713-C	Stores	TC-713 B
713-D	Lumber Stores	TC-9 TC-8

713-E	Stores	TC-4
713-F	Stores	TC-13
713-G	Temporary Stores	TC-53
713-H	Temporary Stores	TC-30
714	Storage Platform	
715	Flag Pole	
717-A	Shop and Supply Storage House	
717-B	Special Machine Shop	
717-C	Carpenter Shop	305 Project 58
717-D	Paint Shop	TC-63
717-E	Salvage Shop & Storage	TC-4
717-F	Rigger Loft	TC-4
717-G	Electric Shop	TC-14
717-H	Field Storage Shop	TC-3
717-I	Insulation Storage	TC-3
719	First Aid and Service House	
720	Patrol Headquarters	
723	Laundry	
724	Gas Station	
725-A	Auto Service Station	
725-B	Bus Service Station	TC-19
726	Propane Storage	
729	Spare Parts Storage	TC-61
735	Training Building	
737	Rain Shelter	
745	Pistol Range	TC-34
801	Boiler House	
802	Reservoir	
805	Purchased Power	
807	Water Treatment House	
811	Wells	
812	Pump House	
813	Filter Plant	
814	River Pump House	
815	Overhead Water Storage	





8150
84.10

850
840
830

LEGEND FOR TYPE OF FENCE
 --- 1 ---
 --- 2 ---
 --- 3 ---

COOLING WATER POND
 THIS POND SHALL BE 100 FEET IN DIAMETER
 AND SHALL BE CONSTRUCTED AT E. 810 ±
 WITH A 1% SLOPE TO THE CENTER
 OF THE POND.

TOPOGRAPHIC MAP
 CLINTON ENGINEER WORKS

0 20 40 60 80 100 FEET



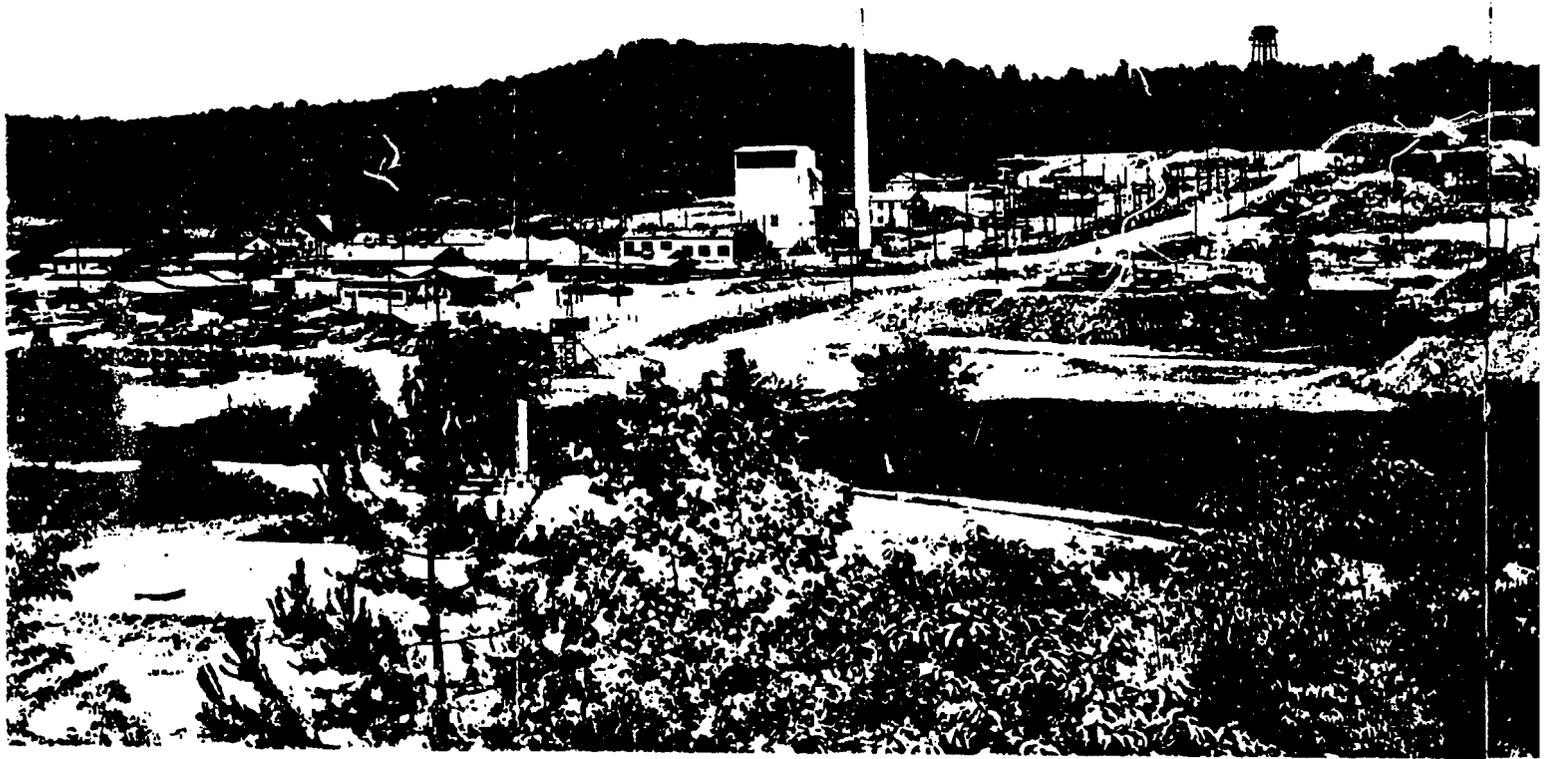
MAR 31 1942



View of Temporary Construction Area
Looking Southwest
Project 9733
Clinton Engineer Works
Roll 13-6 Date 3-25-43



Panoramic View of TNX Area
Looking Northwest
Projects 9733 & 58
Clinton Engineer Works
Roll 17-6 & 7 Date 4-15-43

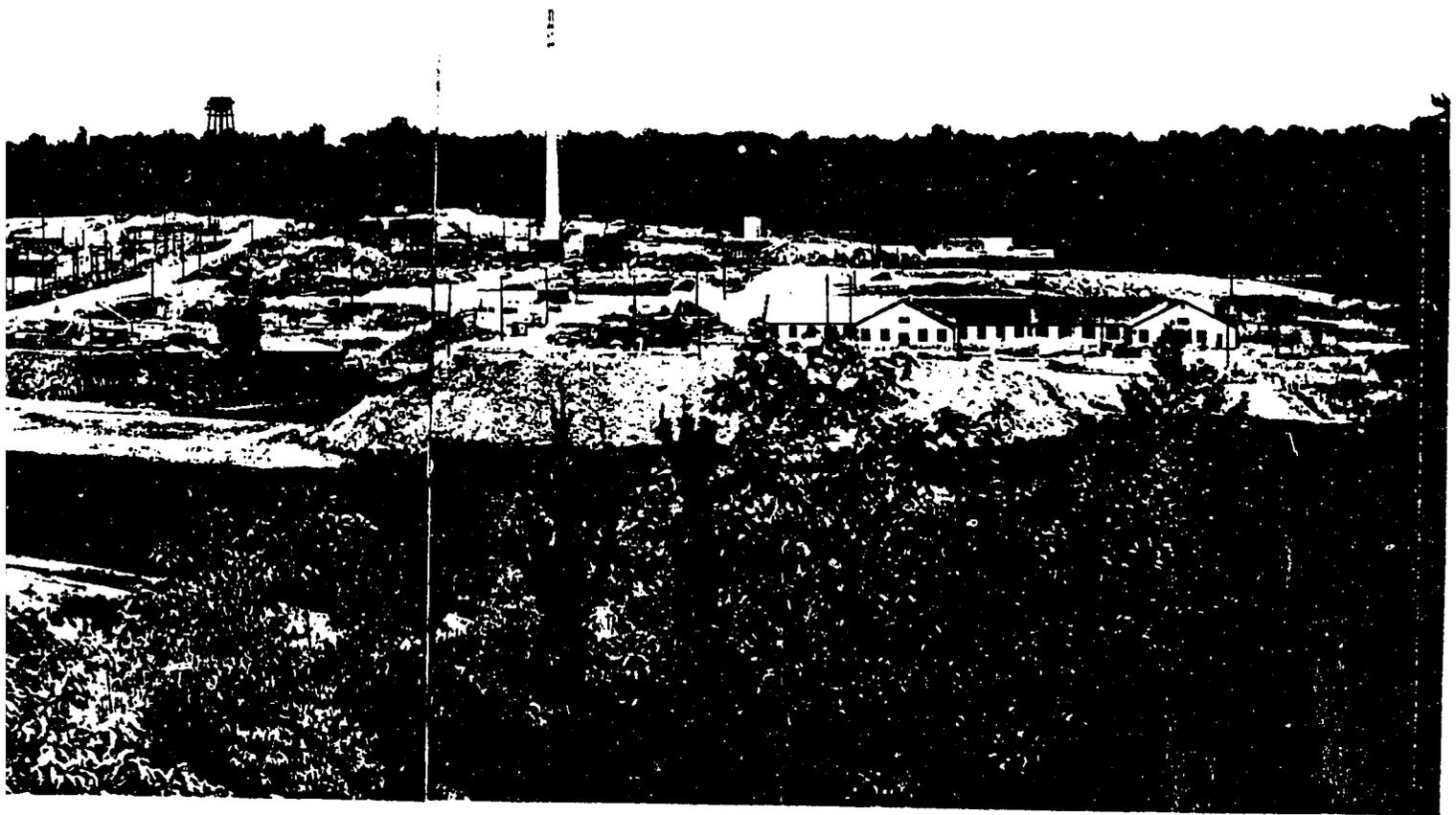


Clinton Engineer Works - Oak Ridge, Tennessee
A. Engineer Office
Ridge, Tennessee
TNX Area - Panorama "A" of TNX Area from Hill back of Disposal Plant

27 June 1963
No. 30

inc

of

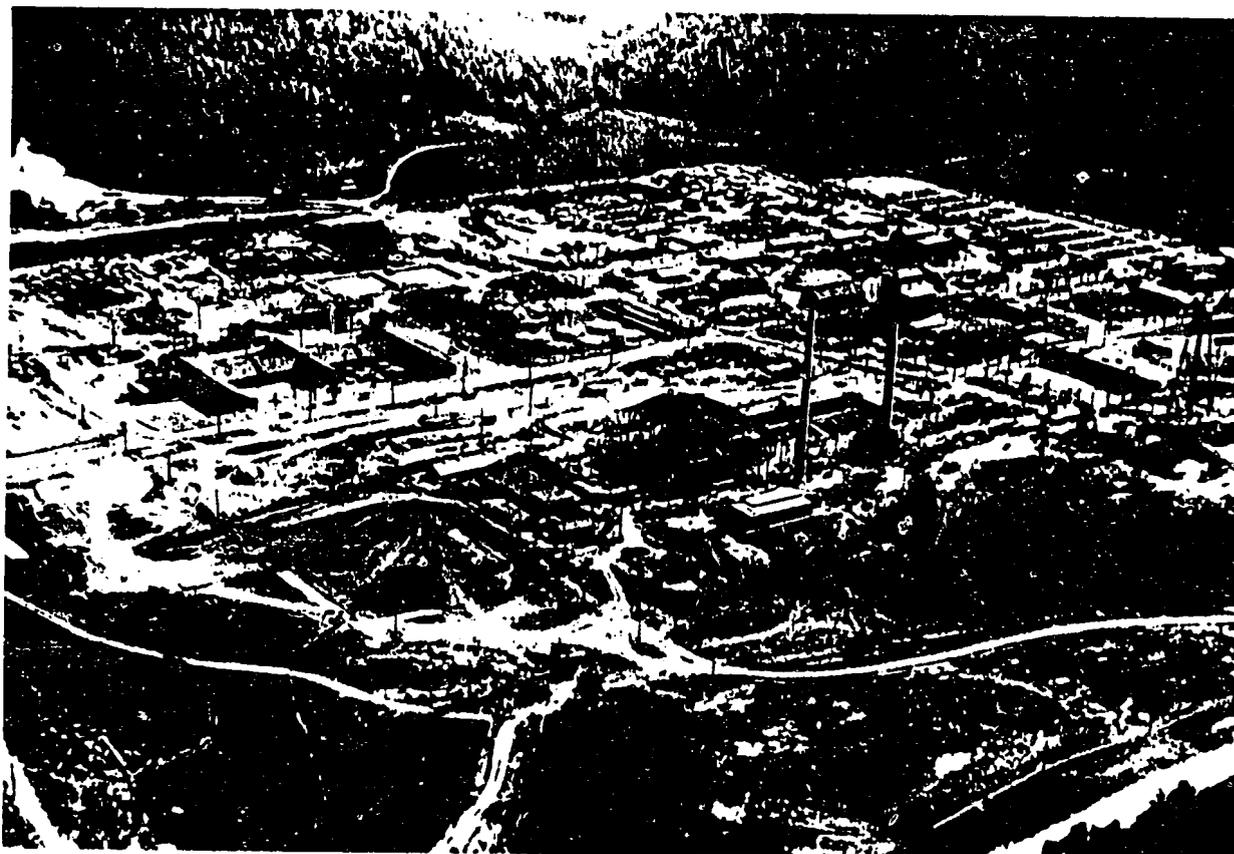


27 June 1943
No. 46
Plant

near Works - Oak Ridge, Tennessee

27 June 1943
No. 47

of TNX Area from Hill back of Disposal Plant

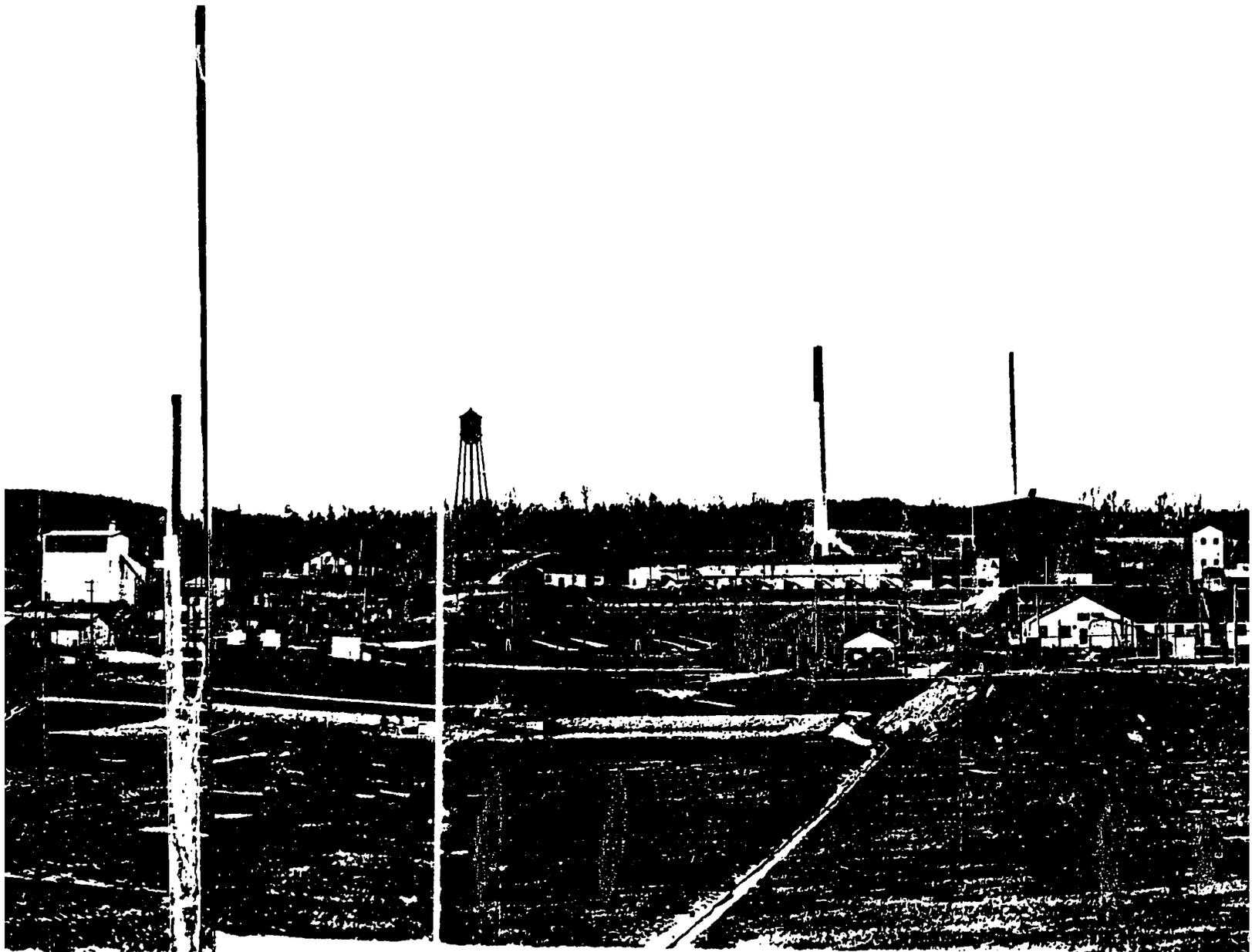


Aerial View of Plant Area
Looking Southwest
Project 9733
Clinton Engineer Works
Roll 76-11 Date 8-31-43



U S Engineer Office
Oak Ridge, Tennessee

Clinton Engineer Works - Oak Ridge, Tenn
TNX Area - Panorama A of West End of Process



Tennessee
Ess Area

Dec. 20, 1943
No. 71

U. S. Engineer Office
Oak Ridge, Tennessee

Clinton Engineer Works (Oak Ridge)
TNX Area - Panorama B of East End



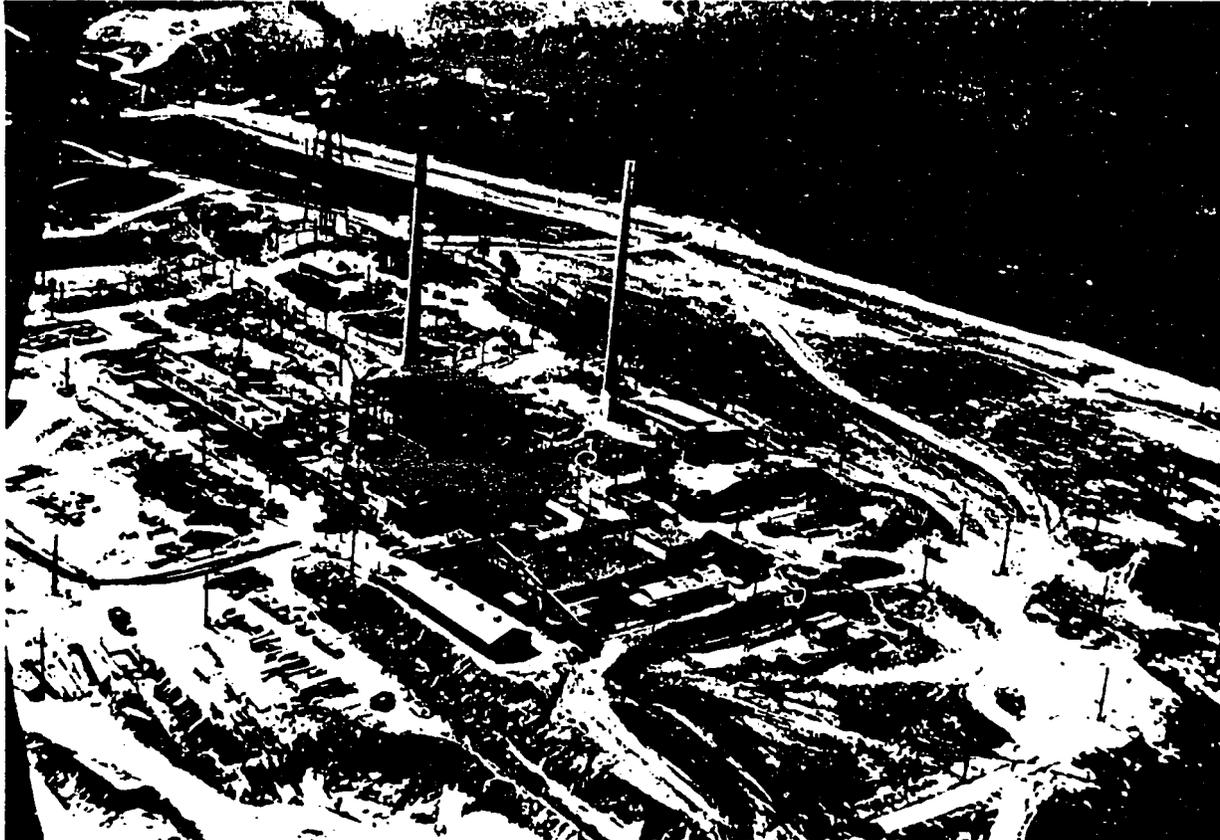
Office
ennessee:

Clinton Engineer Works - Gas Ridge, Tennessee
TNX Area - Panorama B of East End of Process Area.

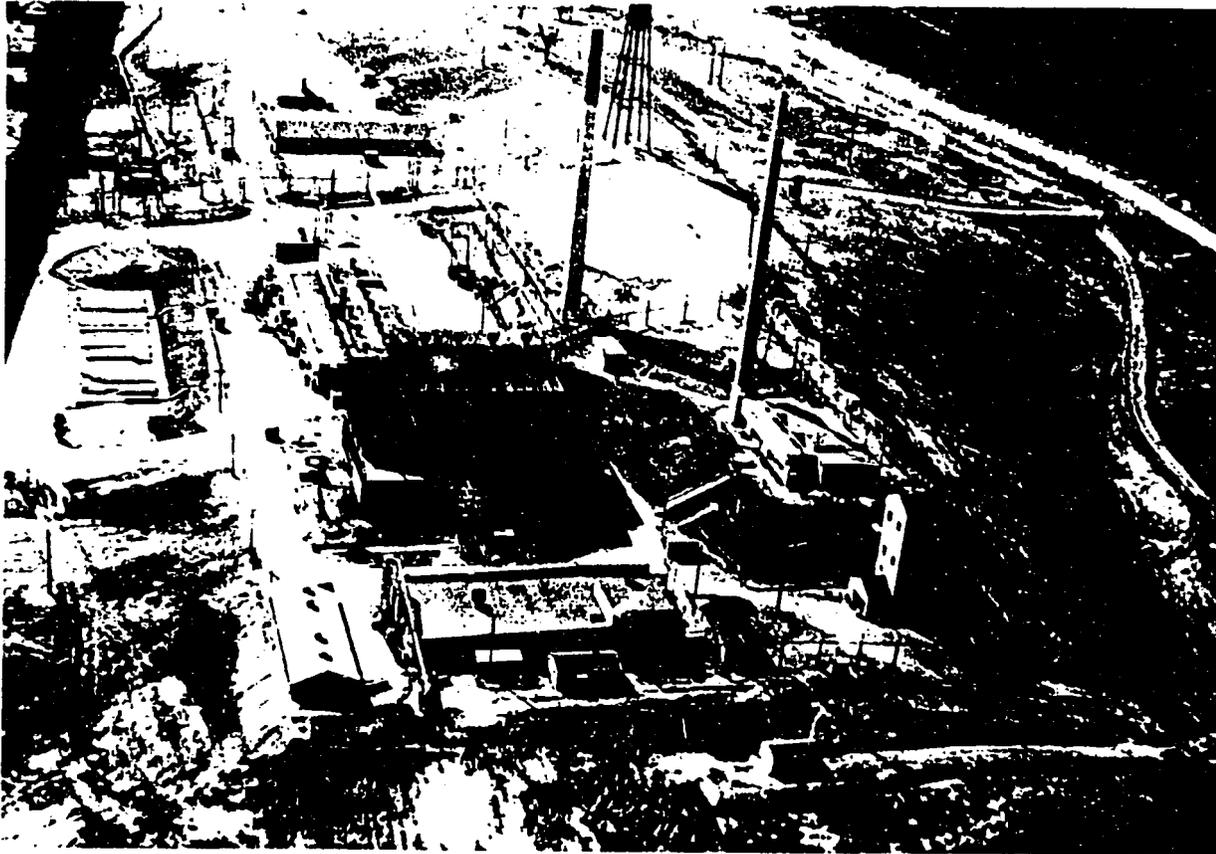
Dec. 20, 1943
No. 72



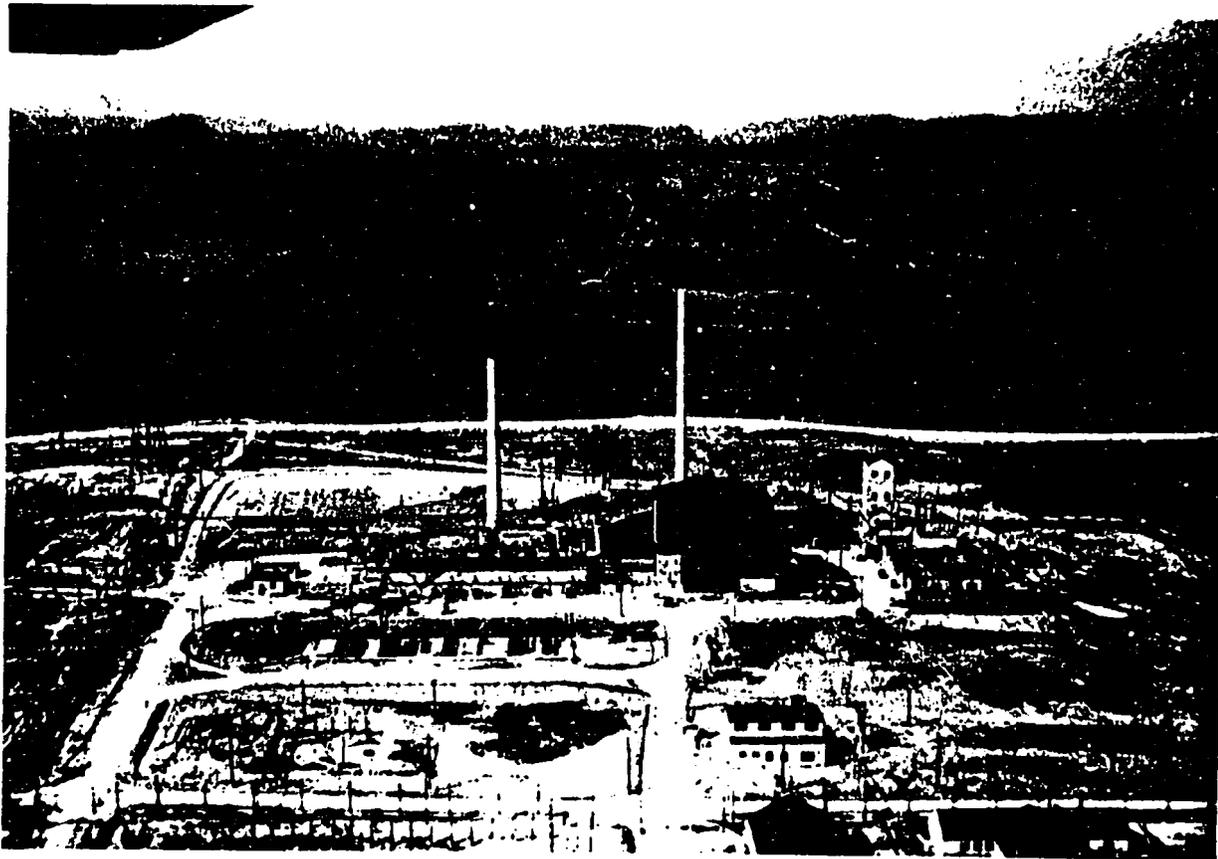
Aerial View of Plant Area
Looking East
Project 9733
Clinton Engineer Works
Roll 206-23 Date 3-10-44



Aerial View of 100 & 200 Process Areas
Looking Northwest
Project 9733
Clinton Engineer Works
Roll 76-14 Date 8-31-43



Aerial View 100 & 200 Process Areas
Looking Due West
Project 9733
Clinton Engineer Works
Roll 206-27 Date 3-10-44



Aerial View of 100 & 200 Process Areas
Looking North
Project 9733
Clinton Engineer Works
Roll 206-29 Date 3-10-44



U. S. Engineer Office
Oak Ridge, Tennessee

Clinton Engineer Works - Oak Ridge, Tennessee
Contract No. W-7412-eng-23
TNX Area - Process Building (101)

27 June-1943
No. 48.

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 101
- (2) Name - PROCESS AREA HOP
- (3) Date Construction Started - March 23, 1943
- (4) Date Start Up - May 27, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORY - December 7, 1943
- (6) Date Construction Completed - December 4, 1943
- (7) Date Accepted by Government - December 10, 1943
- (8) Type of Construction - 1 story wood frame structure; reinforced concrete pier and beam foundations, and reinforced concrete wall with spread footing foundations; reinforced concrete floor; 1" T & G sheeting, decking and drop siding with building paper insulation between the decking and drop siding; shed roof pitched two ways with A.C.S. roof ventilators; wooden truss supported roof for elevated section over preliminary assembly room; fibre board partition lining; exposed studding and rafters; and wooden doors, sash, frames and louvres.
- (9) Dimensions - 61' 0" x 131' 0"; 25' 6", 16' 4" & 13' 3 1/2" eaves; 12' 0" minimum ceiling; 20' 2" maximum ceiling Assembly Room.
- (10) Total Volume - 144,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 7800 sq. ft. concrete 4" thick
- (12) No. Rooms - 3 - Preliminary Assembly, Layout & Assembly, and Mill Room
- (13) No. Board Ft. Lumber - Total 48,000 bd. ft. - 24,000 bd. ft. frame; 8,000 bd. ft. drop siding; 16,000 bd. ft. decking and sheeting; 2,000 sq. ft. 1/2" fibre board.
- (14) No. Cu. Yds. Concrete - 271 cu. yds.
- (15) Sq. Roofing & Type - 50 s.a. Built-Up
- (16) No. Tons Structural steel - None
- (17) Eng. Services & Facilities - steam heat; steam; forced draft ventilation; dust collecting system; lighting 110 V, A.C., 60 C; power 220/440 V, 3 P, 60 C; and telephone.

- (18) Additions & Changes - STORAGE BLDG. - See TC-53
CHANGE HOUSE - See TC-52
LAUNDRY - See TC-53
AREA OFFICE BLDG. - See TC-54

- (19) Major Bldg. Equipment - Start up date of woodworking equipment - May 27, 1943

The type of equipment installed in this building was essentially woodworking with necessary dust collecting and ventilating systems and was as follows:

2-20" Monarch hand planers and jointers, electric driven

2-24" Single surface motor driven Baxter Whitney planers

1 Type G&R De Walt swing cut-off saw

1 Cincinnati, type GPWA, 5 H.P., combination grinder and buffer converted to a chamfer machine

1 Buffalo #15 floor-type drill press

1 Crescent #36 wood-cutting band saw

2-16" Baxter Whitney tilting arbor circular wood cut-off saws

1-45" Buffalo Forge, type UX, exhaust fan, texrope drive, 20 H.P. motor

1-#125 Silentvane fan, texrope drive, 15 H.P. motor

1 Cyclone separator

2 Lewis Shepard 2000 lb. electric stackers

4-2000 lb. lift trucks

30-2500 lb. platforms

1-5000 lb. lift truck

6-5000 lb. platforms

Miscellaneous shop tools

[REDACTED]

SUMMARY BUILDING DATA

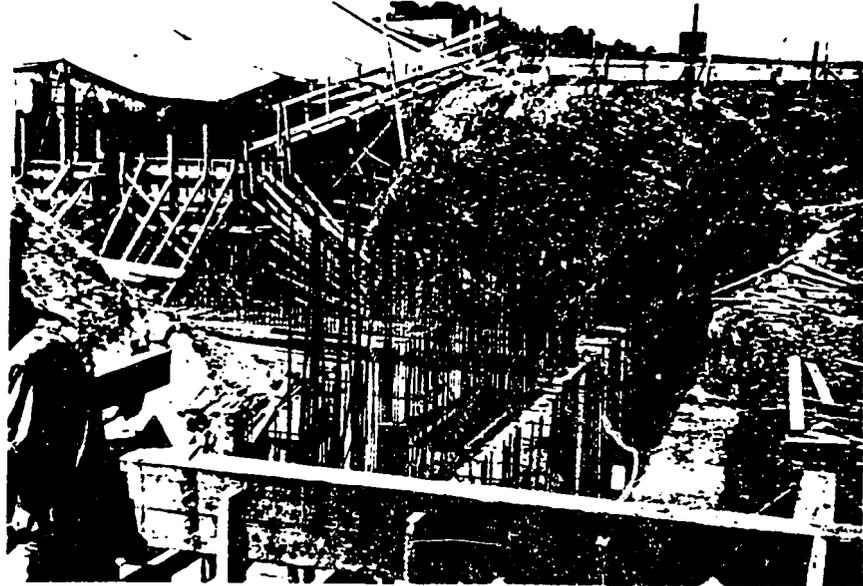
- (1) Building No. - 102
- (2) Name - PROCESS AREA INSTRUMENT STORAGE BUILDING & OFFICE
- (3) Date Construction Started - April 8, 1943
- (4) Date Start Up - June 5, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 7, 1943
- (6) Date Construction Completed - December 4, 1943
- (7) Date Accepted by Government - December 10, 1943
- (8) Type of Construction - 1 story wood frame gabled structure with concrete curtain wall foundation and concrete floor and base partially cushioned on cork board. The main structure floor is covered with asphalt tile and has 1" T & G sheathing, decking and drop siding with building paper insulation between siding and decking. Storage room and office are lined with acoustic tile board and insulated with balsam wool. Main structure has a gabled truss supported roof; compressor and entrance rooms have shed roofs; passageway has gabled roof. Main vestibule is lined with rock board; side vestibule, compressor room and passageway have exposed studding and rafters. This structure has wooden doors, sash, frame and louvres.
- (9) Dimensions - Main structure 20' 9" x 40' 9", 10' 0" ceiling, 11' 0" eaves, 5' 2" gable.
Passageway 9' 0" x 17' 2 1/2", 9' 6" eaves.
Entrance rooms 14' 0" x 7" 9/16", 9' 6" & 8' 6" eaves.
Compressor room 5' 0" x 5' 6", 4' 9" eaves.
- (10) Total Volume - 14,750 cu. ft.
- (11) Sq. Ft. Floor & Type - 1,060 sq. ft. concrete 4" thick, 800 sq. ft. asphalt tile 3/8" thick, 280 sq. ft. 2" cork board.
- (12) No. Rooms - 7 - Office, Instrument Storage Room, Compressor Room, Toilet Room, Passageway, and 2 vestibules.
- (13) No. Board Ft. Lumber - Total 8400 bd. ft. - 3000 bd. ft. frame, 1800 bd. ft. drop siding, 3600 bd. ft. sheathing and decking, 750 sq. ft. 1/2" rock board, 1850 sq. ft. 1" acoustic tile board.
- (14) No. Cu. Yds. Concrete - 52 cu. yds.
- (15) Sq. Roofing & Type - 16.4 sqs. Built-Up Roofing.

- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Steam heat; filtered water; sanitary sewers; plumbing and drainage; toilet and wash-room facilities; air conditioning; lighting 110 V, A.C., 60 C; power 220/440 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Added: Toilet room and plumbing facilities, and stand-by gasoline driven motor generator set, 3 KW 110 V, A.C., 60 C.
- (19) Major Bldg. Equipment - Start up date Air Conditioning Equipment - June 15, 1943.
The type of equipment installed in this building was as follows:
1 Frigidaire "Freon" Electric Compressor
1 Air Supply Unit (1200 CFM)
Miscellaneous office furniture and equipment

[REDACTED]

SUMMARY BUILDING DATA

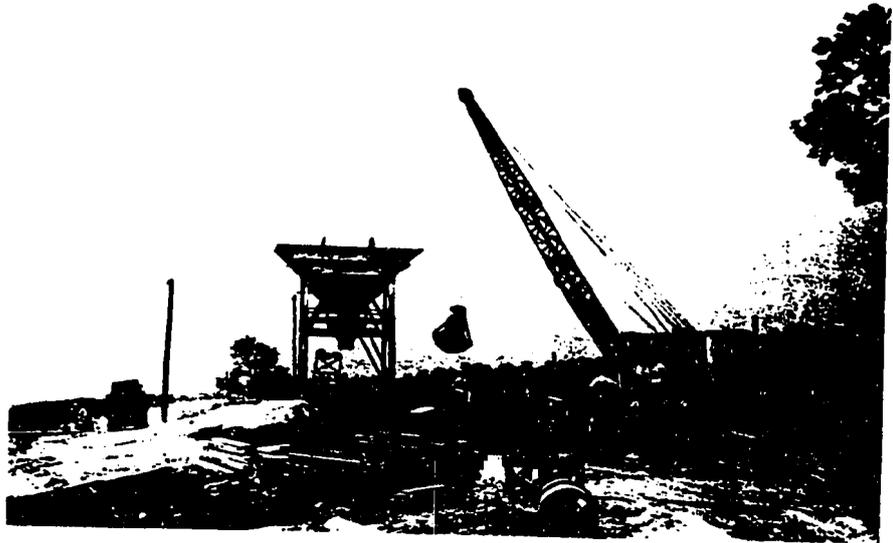
- (1) Building No. - 103
- (2) Name - PROCEB AREA VAULT
- (3) Date Construction Started - June 15, 1943
- (4) Date Start Up - September 9, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - September 13, 1943
- (6) Date Construction Completed - August 14, 1943
- (7) Date Accepted by Government - September 17, 1943
- (8) Type of Construction - 1 story brick and concrete structure with 6" reinforced concrete roof and concrete floor slabs, 12" brick walls, concrete curtain wall foundation, and a 4 hour combination steel vault door with an inner wood panel door.
- (9) Dimensions - 17' 2" x 17' 2", 5' 7 1/8" eaves, 5' 0" ceiling.
- (10) Total Volume - 2890 cu. ft.
- (11) Sq. Ft. Floor & Type - 220 sq. ft. concrete " " thick.
- (12) Total No. Brick - 9744, 2" x 4" x 8" Red Common.
- (13) No. Rooms - 1
- (14) No. Board Ft. Lumber - 500 bd. ft. Trim and Shelving.
- (15) No. Cu. Yds. Concrete - 27 cu. yds.
- (16) Sq. Roofing & Type - 4 sqs. Built-Up.
- (17) No. Tons Structural Steel - None.
- (18) Elec. Services & Facilities - Lighting 110 V, A.C., 60 C.
- (19) Additions & Changes - Waterproofed floor and added 2" concrete finish.
- (20) Major Bldg. Equipment - None.



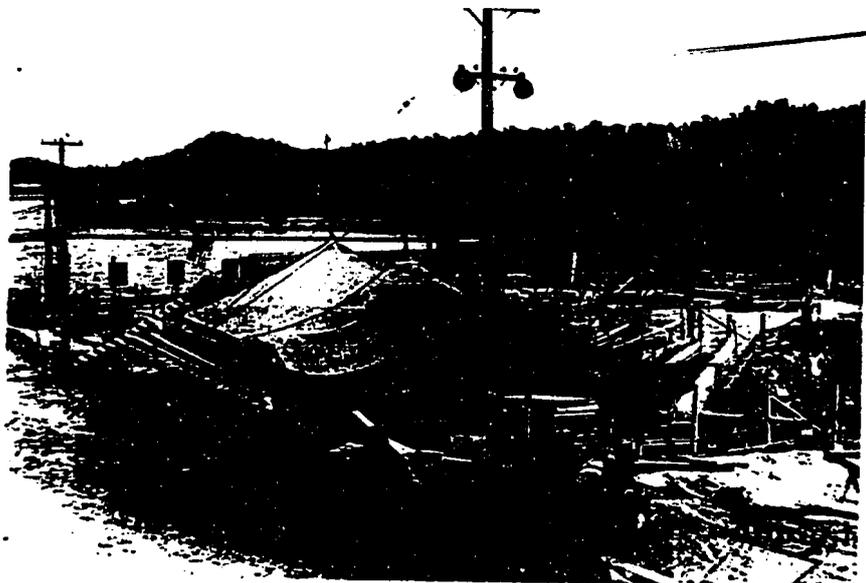
Canal - Bldg. 105
Looking East
Project 9733
Clinton Engineer Works
Roll 28-19 Date 6-4-45



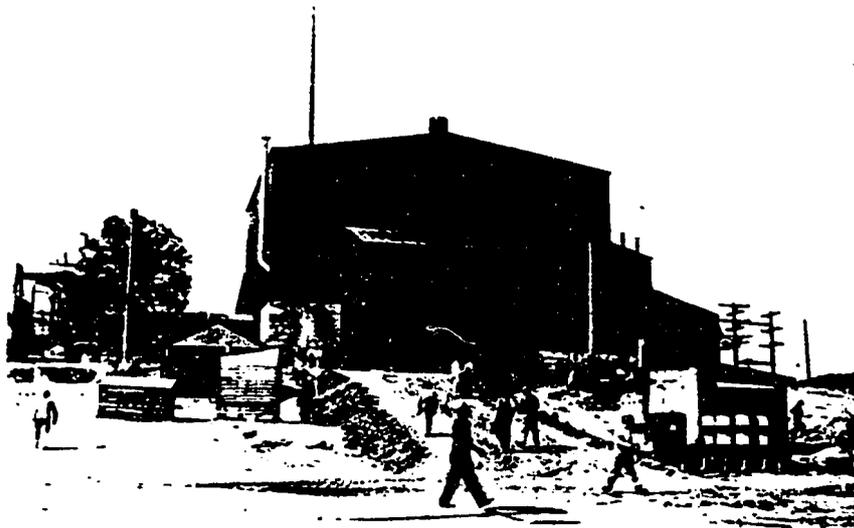
Pile Building - Bldg. 105
Looking South East
Project 9733
Clinton Engineer Works
Roll 44-9 Date 7-14-45



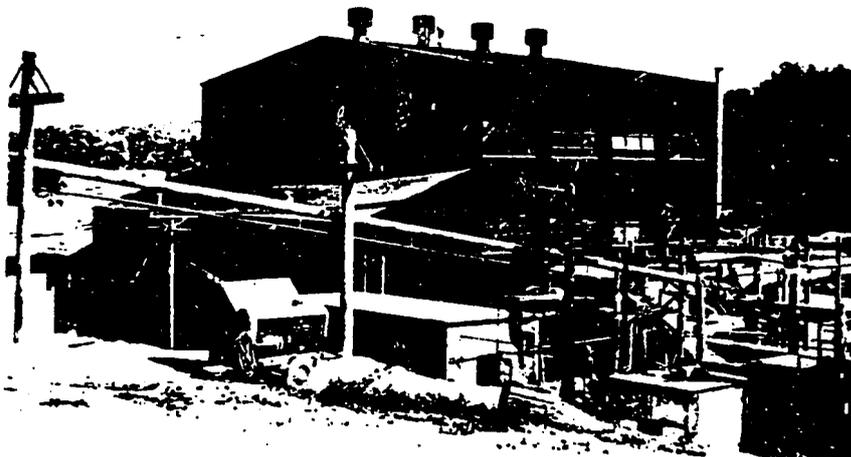
103 Concrete Batch Plant
Looking West
Project 9733
Clinton Engineer Works
Roll 24-29 Date 5-22-43



105 Building Protection
Looking East
Project 9733
Clinton Engineer Works
Roll 28-18 Date 6-4-43



Pile Building - Bldg. 105
Looking North
Project 9733
Clinton Engineer Works
Roll 97-44 Date 10-11-43



Pile Building - Bldg. 105
Looking South East
Project 9733
Clinton Engineer Works
Roll 97-5 Date 10-11-43

SUMMARY BUILDING DATA

- (1) Building No. - 105
- (2) Name - PILE BUILDING
- (3) Date Construction Started - April 26, 1943
- (4) Date Start Up - November 5, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES w/
Exceptions - November 3, 1943
Date Final Acceptance Approved by CLINTON LABORATORIES -
December 13, 1943
- (6) Date Construction Completed - December 5, 1943
- (7) Date Accepted by Government w/Exceptions - November 3,
1943
Date of Final Acceptance by Government - December 16,
1943
- (8) Type of Construction - 4 story structural steel, concrete
and wood frame structure of which the main structure
is comprised of structural steel frame with a gabled
truss supported roof over the Pile; 2 story steel frame
lean-to on north and south sides; 2 story wood frame
Laboratory Lean-To on east side; single story lean-to
Filter Room on north side; and two story elevated
concrete and wood frame gabled Core Removal Annex on
west side. The sub-level structure, Hot Laboratory
Canal, is a reinforced concrete L-shaped tunnel
connecting the Pile with the 205 Building. The pile is
completely enclosed reinforced structure with walls
7' 0" thick which are composed of two outside layers
of Class A concrete 12" thick and an intermediate layer
of Class B Haydite concrete 5' 0" thick. Foundations
used were reinforced concrete wall with spread footings,
reinforced concrete pier and beam, and reinforced con-
crete slab. The Hot Laboratory and Instrument Room are
of reinforced concrete explosion-proof construction
with the latter having a fibroacoustic lining. The 105
& 115 Buildings are interconnected by an underground
reinforced concrete venturi fume exhaust duct. The
Laboratory Lean-To Section and Filter Room are lined
with fibre board. The entire structure is covered with
patented "Q" Siding, A.C.M. and Built-Up roof with A.C.M.
roof ventilators, and contains wooden doors, sash, and
wood and steel door frames and stairs.
- (9) Dimensions - Overall structure 140' 0" x 116' 4"; Main
overhead clearance.
Steel Frame Lean-To 29' 0" x 97' 0", 29' 0" x 77' 6";
37' 8" eaves.

Food Frame Laboratory Lean-To 19' 4" x 140' 0",
 23' 0" eaves, 10' 0" ceiling.
 Core Removal Annex 90' 0" x 43' 4"; 26' 0" eaves;
 4' 6" gable; 13' 0" head clearance.
 File 47' 0" x 44' 0" - 46' 8".
 Instrument Room 30' 0" x 24' 0" - 9' 3"; walls 2' 0"
 thick.
 Hot Laboratory 24' 0" x 20' 0" - 12' 3"; walls 3' 0"
 thick.
 Hot Laboratory Canal 34' 0" x 21' 0" - 36' 0" x
 16' 0"; 11' 0" head clearance walkway.
 Bottom Canal 21' 0" to 31' 6" below ground level.
 Exhaust Duct 112' 6" x 3' 0" x 9' 0", 4' 0" & 5' 0"
 I.D.

- (10) Total Volume - 1,020,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 26,200 sq. ft. concrete 4" thick and
 2" T & G wood.
- (12) No. Rooms - 22 - Main Operating Room, File, Hot Laboratory,
 Hot Laboratory Canal, Instrument Room, Core Removal
 Annex, Filter Room, 10 Laboratories, 2 Offices, Locker
 Room, and Men and Women's Toilet Rooms.
- (13) No. Board Ft. Lumber - 71,000 bd. ft. total - 46,000 bd. ft.
 frame; 25,000 bd. ft. decking and sheathing; 15,000 sq.
 ft. 1/2" fibre board; 3000 sq. ft. 1" Fibraoustic.
- (14) No. Cu. Yds. Concrete - 5038 cu. yds. Class A; 1,118 cu. yds.
 Class B, Haydite Concrete.
- (15) Sq. Roofing & Type - 135 sqs. A.C.M., 41 sqs. Built-Up
 Roofing.
- (16) No. Tons Structural Steel - 197 tons.
- (17) Bldg. Services & Facilities - Filtered water, raw water; hot
 water; demineralized water; air; propane gas; fire
 system; sprinkler; steam; steam heat; plumbing and
 drainage; toilet and washroom facilities; calgon; per-
 mitted process and sanitary sewers; ventilation; exhaust
 system; air conditioning; lighting 110 V, a.c., 60 C;
 power 220/440 V, 3 P 60 C and 125 V, D.C.; and tele-
 phone.
- (18) Additions & Changes - AUXILIARY ELECTRIC GENERATOR BUILDING-
 Food frame 12' 7" x 8' 7", 8' 0" eaves, rock board lin-
 ing, exposed studding, concrete curtain wall foundation,
 concrete floor, and built-up shed roof--used to house
 one 10 KW stand-by gasoline driven motor generator set,
 110 V, A.C., 60 C.
- (19) Major Bldg. Equipment -
 Start up date Control Rods - 11-23-43
 Start up date of File - 11-4-43

Start up date of Elevators and Charging Machines -
10-23-43 and 12-24-43
Start up date Scanning Device - 2-2-44
Start up date Laboratories - 10-30-43
Start up date Hot Laboratory - 11-13-43
Start up date Instrument Room - 11-1-43

The following list of major equipment was installed:

- 1 12,000# elevator and charging machine
- 2 Monorail systems complete with 4000# electric hoists
- 1 5-ton overhead electric traveling crane
- 1 Pneumatic tube conveyor
- Hydraulic charging mechanisms, rods, accumulators, motor reducers, oil storage tanks, worm gear reduction units, and electric automatic controls.
- 1 Scanning device
- 1 Fairbanks-Morse printing and fan scale
- 1 Size 24 Victor-Acme blower and precipitation cell
- 1 25 KW MG set 125/250 V, D. C.
- *982 Tons graphite bars
- 130 Tons special metal slugs
- 1 Periscope optical device
- 1 Patterson-Kelley hot water heater
- 1 #3 Type LL Buffalo Forge limit load fan
- 6 3/4 HV Clearance fans
- 3 Air conditioning units
- 1 Frigidaire "Freon" compressor
- 5 McCusky floor-type unit heaters
- 1 Air compressor, steam
- 1 Heat exchanger
- Miscellaneous office and laboratory furniture and equipment, core removal equipment, instruments, plugs, safety equipment, electrical and mechanical controls, etc.

* Correction: 700 tons - approximate weight in finished form



Exhaust Duct - Bldg. 105
Looking North
Project 9733
Clinton Engineer Works
Roll 44-11 Date 7-14-43



Carbutizer & Storage Bldg. - 105-E
Looking South East
Project 9733
Clinton Engineer Works
Roll 44-17 Date 7-14-43

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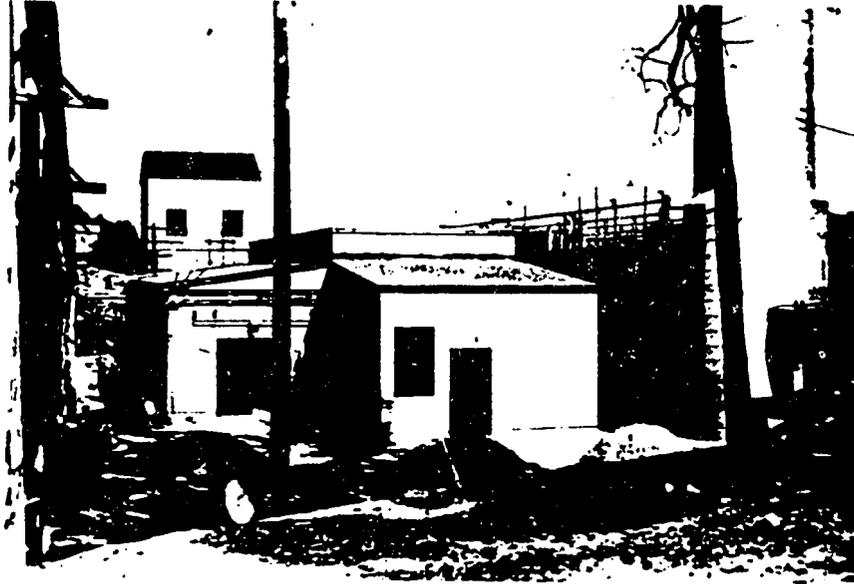
SUMMARY BUILDING DATA

- (1) Building No. - 105-b
- (2) Name - CARBURIZER BUILDING, STORAGE HOUSE, AND HYDROGEN STORAGE PLATFORM
- (3) Date Construction Started - June 15, 1943
- (4) Date Start Up - June 26, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - November 13, 1943
- (6) Date Construction Completed - July 10, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction
Carburizer Bldg.: - 1 story wood frame, rock board lining, exposed studding, concrete floor slab foundation, gable roof, wooden doors, frames and sash.
Storage Building: - Same as Carburizer Bldg.
Storage Platform: - Wood frame on mud sills, open lattice work, shed roof.
- (9) Dimensions
Carburizer Bldg.: - 12' 0" x 30' 0", 9' 0" eaves, 3' 7" gable.
Storage House: - 30' 0" x 40' 0", 9' 0" eaves, 6' 3" gable.
Platform: - 12' 0" x 16' 0", 12' 0" eaves.
- (10) Total Volume - Carburizer Bldg.: - 4540 cu. ft.
Storage House: - 15,400 cu. ft.
Platform: - 2000 cu. ft.
- (11) Sq. Ft. Floor & Type
Carburizer Bldg.: - 330 sq. ft. (concrete 8" thick)
Storage House: - 1150 sq. ft. (concrete 8" thick)
Platform: - 190 sq. ft. (2" T & G wood)
- (12) No. Rooms - 1 room each bldg.
- (13) No. Board Ft. Lumber - Total 7700 bd. ft. - 2500 bd. ft. sheathing, 5200 bd. ft. frame, 2000 sq. ft. 1/2" rock board.
- (14) No. Cu. Yds. Concrete - 45 cu. yds.
- (15) Sq. Roofing & Type - 21 sqs. Tar Paper Roll Roofing.
- (16) No. Tons Structural Steel - None.

(17) Bldg. Services & Facilities - Filtered water; hydrogen; nitrogen; air; lighting 110V, A.C., 60 C; power 220/440 V, 3 P, 60 C.

(18) Additions & Changes - These buildings were constructed in order to test material before installation in the 105 Pile Building.

(19) Major Bldg. Equipment - One Heavy-Duty Vertical Rotort Electric Furnace, 71 K., 230 V, with motor driven fan cover and recording, controlling, indicating pyrometer potentiometers. Start-up date - June 27, 1943.
Six assembled air testing devices fabricated by theilmington Shops. Start-Up date - October 10, 1943.
This equipment was used to test special test pieces that were to be used in the 105 Building.



Exhauster Building - Bldg. 115
Looking East
Project 9733
Clinton Engineer Works
Roll 97-4 Date 10-11-43



Exhauster Building - Bldg. 115
Looking North East
Project 9733
Clinton Engineer Works
Roll 120-35 Date 11-11-43

SUMMARY BUILDING DATA

- (1) Building No. - 115
- (2) Name - EXHAUSTER BUILDING
- (3) Date Construction Started - April 16, 1943
- (4) Date Start Up - November 5, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES w/
Exceptions - November 3, 1943
Date Final Acceptance Approved by CLINTON LABORATORIES -
December 13, 1943
- (6) Date Construction Completed - December 5, 1943
- (7) Date Accepted by Government w/Exceptions - November 3,
1943
Date Final Acceptance by Government - December 16, 1943
- (8) Type of Construction - Main structure reinforced concrete
slab foundations, walls and flat roof slab with wood
frame operating room lean-to on the north and west
sides. Each lean-to is covered with 1" T & O sheet-
ing, decking and drop siding with building paper
insulation between decking and siding and has rein-
forced concrete curtain wall foundation and reinforced
concrete floor. Instrument room is lined with rock
board and has gypsum board ceiling. This building has
wood and steel doors and frames, and wooden sash and
stairways. Also included with this structure is an
underground reinforced concrete seal tank and rein-
forced concrete exhaust stack.
- (9) Dimensions - Main structure 50' 0" x 37' 0" x 12' 0" high.
Lean-To 30' 0" x 16' 0", 12' 6" eaves, 12' 0" head
clearance.
Seal Tank 11' 0" O.D. - 7' 0" I.D. x 23' 0" deep.
Exhaust Stack 200' 0" high, bottom 12' 9" O.D. - 8' 6"
I.D., top 6' 9" O.D. - 5' 9" I.D.
- (10) Total Volume - 113,200 cu. ft.
- (11) Sq. Ft. Floor & Type - 3,760 sq. ft. concrete 4" thick.
- (12) No. Rooms - 6 - Operating Room, 3 Pan Rooms, Instrument Room,
and Condensing Chambers
- (13) No. Board Ft. Lumber - Total 17,500 bd. ft. sheeting, decking
and drop siding; 10,000 bd. ft. frame; 600 sq. ft. 1/2"
rock board; 400 sq. ft. 3/8" gypsum board.
- (14) No. Cu. Yds. Concrete - 1811 cu. yds.

- (15) Sq. Roofing & Type - 32.5 Built-Up
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Steam; steam heat; air; filtered water; raw water; process lines; fire protection sprinklers; plumbing and drainage; process and sanitary sewers; lighting 110 V, A.C., 60 C; power 220/440 V, 3 P, 60 C and 2300 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Instrument Room 20' 4" x 19' 8", 12' 6" eaves, 10' 0" ceiling, added to west end of building.
- (19) Major Bldg. Equipment - Start up date for all three Exhaust Fans - November 1, 1943

The type of equipment installed in this building is composed mainly of exhaust instruments and air conditioning, which was as follows:

- 1 50,000 CFM, special #12, type "MD" fan, American Blower Corporation, with direct drive; 250 H.P., 2300 V, 3 P, 60 C; and cubicle starter.
 - 1 #8, type "SL", Buffalo Forge Fan, 30,000 CFM, with V belt drive; 50 H.P., 2300 V, 3 P, 60 C motor, and cubicle starter.
 - 1 #3t, type "LL", Buffalo Forge Fan, 5000 CFM, with V belt drive; and Troy Enberg, type B vertical piston steam engine.
 - 1 #24, type "AP" Roots - Cornersville Victor Lame blower, with V belt drive; $\frac{1}{2}$ H.P.; single P, 60 C motor, 1725 RPM.
 - 1 Carrier air conditioning unit having a capacity of cooling $\frac{1}{2}$ gallon water per minute from 75° F to 40° F.
 - 1 Westinghouse 9 $\frac{1}{2}$ " x 9 $\frac{1}{2}$ " x 10" air cooled, single stage, double neting steam driven compressor (49 cu. ft. per min.).
 - 1 Concrete exhaust stack 200' high and concrete suction duct.
- Miscellaneous safety and recording instruments.

SUMMARY BUILDING DATA

- (1) Building No. - 204
- (2) Name - EXHAUST GAS LABORATORY
- (3) Date Construction Started - August 24, 1943
- (4) Date Start Up - December 5, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 22, 1943
- (6) Date Construction Completed - December 14, 1943
- (7) Date Accepted by Government - December 28, 1943
- (8) Type of Construction - 1 story wood frame structure; reinforced concrete curtain wall foundation and reinforced concrete floor; 1" T & G sheathing, decking and drop siding with building paper insulation between decking and siding; ceiling and walls lined with rock insulation; rock board lining, gypsum board ceiling and wooden doors, frames, and sash.
- (9) Dimensions - 31' 9 $\frac{1}{2}$ " x 14' 3 $\frac{1}{2}$ ", 11' 0" eaves, 10' 0" minimum ceiling.
- (10) Total Volume - 5825 cu. ft.
- (11) Sq. Ft. Floor & Type - 420 sq. ft. concrete 4" thick
- (12) No. Rooms - 3 - Laboratory Room, Instrument Room and Chamber Vault
- (13) No. Board Ft. Lumber - 4400 bd. ft. total - 2800 bd. ft. decking, sheathing and siding, 1600 bd. ft. frame, 1750 sq. ft. $\frac{1}{2}$ " rock board
- (14) No. Cu. Yds. Concrete - 22 cu. yds.
- (15) Sq. Roofing & Type - 5.0 sqs. Built-Up
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Raw water; filtered water; plumbing and drainage; air; steam; steam heat; process drain lines; air conditioning; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Only minor changes in location of equipment.

(19) Major Bldg. Equipment - Start up date for air cooling unit - November 5, 1943.

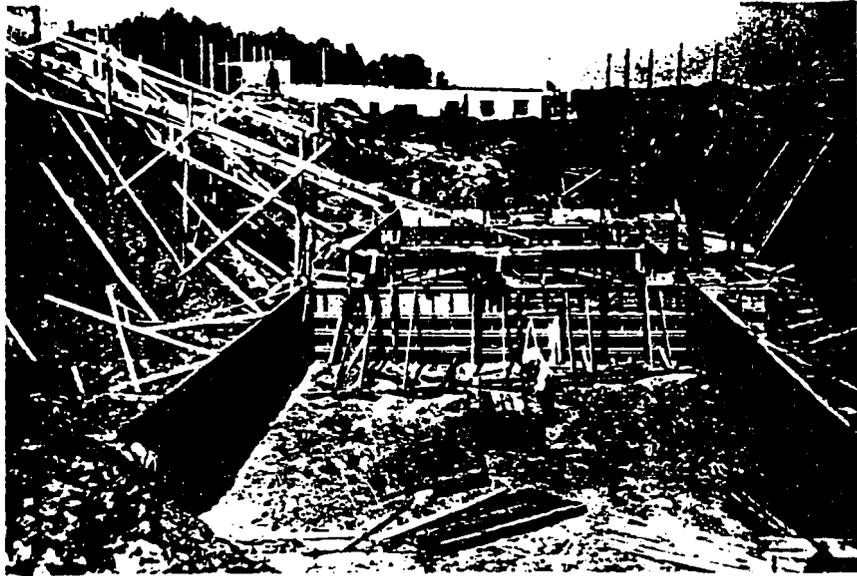
Start up date for gas analyzing equipment and instruments - Approximately January 1, 1944.

The equipment installed in this building consists mainly of laboratory and gas analyzing equipment, which is as follows:

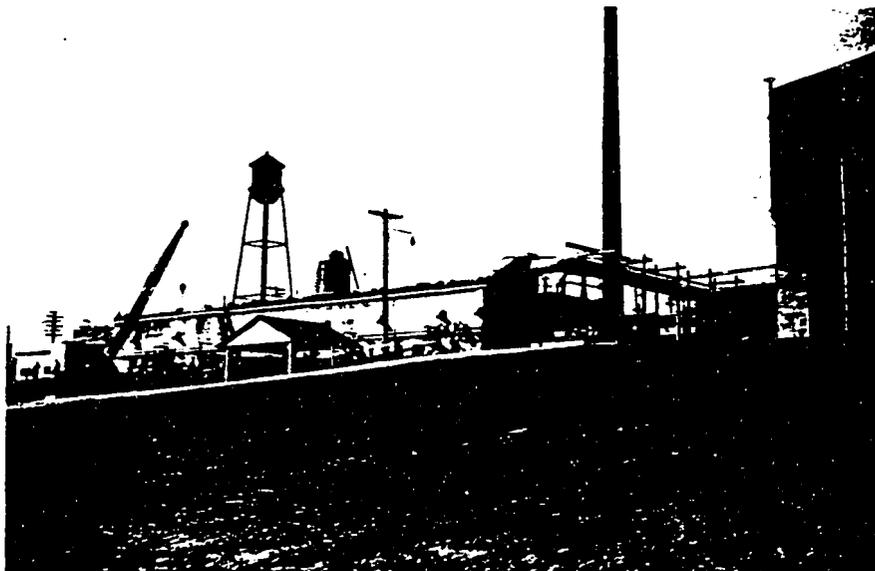
1 air conditioning unit, Chrysler Air temp. #3SCD cooling unit, 1200 C.F.M.

Misc. safety and recording instruments.

Misc. laboratory furniture and equipment.



Excavation & Forms - Bldg. 208
Looking East
Project 9733
Clinton Engineer Works
Roll 20-2 Date 5-1-43



Separation Building - Bldg. 208
Looking North West
Project 9733
Clinton Engineer Works
Roll 120-28 Date 11-11-43



Separation Building - Exhaust Dust - Bldg. 205
Looking Northeast
Project 9735
Clinton Engineer Works
Roll 120-36 Date 11-11-43



Separation Building - Bldg. 205
Looking Northeast
Project 9735
Clinton Engineer Works
Roll 120-29 Date 11-11-43

SUMMARY BUILDING DATA

- (1) Building No. - 205
- (2) Name - EXTRACTOR BUILDING
- (3) Date Construction Started - March 9, 1943
- (4) Date Start Up - December 13, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES W/
Exceptions - December 7, 1943
Date Final Acceptance Approved by CLINTON LABORATORIES -
December 22, 1943
- (6) Date Construction Completed - December 4, 1943
- (7) Date Accepted by Government W/Exceptions - December 10,
1943
Date Final Acceptance by Government - December 28, 1943
- (8) Type of Construction - Reinforced concrete and wood frame structure. Main structure reinforced concrete explosion-proof structure composed of six cells with removable roof slab sections, and with individual sub-stairway entrances and a sub-level concrete canal and pipe gallery running along the entire north side of structure connecting with Hot Laboratory Canal and walkway which runs between 105 and 205 Buildings. A wood frame lean-to composed of operating room, mixing room, and unloading platform shed runs along entire north wall of main structure and has a reinforced concrete explosion-proof laboratory on the west end and with an additional wood frame lean-to air conditioning room on the extreme west end of the laboratory. Types of foundation used are as follows: reinforced concrete slab, reinforced concrete curtain wall and reinforced concrete wall with spread footings. Wood frame portion is covered with 1" T & G decking, sheeting and drop siding with building paper insulation between siding and decking, and has rock board partitions and wooden doors, frames, and sash. A buff tile partition runs lengthwise between mixing and operating rooms. All other partitions are studded and lined with rock board. The explosion-proof laboratory is lined with fibroacoustic board. Floors are composed of reinforced concrete acid-proof brick, asphalt tile, grating, linoleum and wood. Flat concrete roofs were treated with waterproofing and Built-Up roofing was used for all lean-to roofs. Also included in this structure is a concrete exhaust stack and overhead concrete and sheet metal exhaust duct.
- (9) Dimensions - Cells 166' 0" x 28' 0" x 35' 0" high, 27' 0" head clearance, concrete walls 4' 0" & 5' 0" thick.

Tunnel and Pipe Gallery 193' 8" x 14' 0" x 9' 0",
 8' 0" x 8' 0" passageway.
 Operating Room 166' 0" x 16' 0", 17' 0" high, 12' 0" ceiling.
 Laboratories 48' 3" x 33' 0", 17' 0" high, 12' 0" & 9' 4" ceilings, barricade walls 2' 0" thick.
 Unloading Platform Shed 174' 0" x 15' 0", 4' 0" high, 13' 0" eaves, 9' 0" head clearance.
 Air Conditioning Room 12' 6" x 22' 6", 12' 6" eaves.
 Exhaust Stack 200' 0" high, bottom 13' 10 3/8" O.D. - 7' 0" I.D., top 7' 6" O.D. - 5' 0" I.D. acid-resisting brick lining.
 Exhaust Duct 161' 0" x 4' 2" - 5' 0" I.D., 6" walls.

- (10) Total Volume - 335,350 cu. ft., not including stack.
- (11) Sq. Ft. Floor & Type - 10,780 sq. ft. concrete, 700 sq. ft. acid-proof brick, 660 sq. ft. asphalt tile, 435 sq. ft. linoleum, 700 sq. ft. wood, 225 sq. ft. grating.
- (12) No. Rooms - 18 - 6 Cells, Pipe Gallery, Operating Room, Mixing Room, 2 Laboratories, 2 Toilet Rooms, Shower Room, Locker Room, Storage Room, Air Conditioning Room, Unloading Shed Platform.
- (13) No. Board Ft. Lumber - 35,000 bd. ft. total; 20,000 bd. ft. frame, 15,000 bd. ft. decking, sheathing and drop siding, 1800 sq. ft. fibroacoustic, 1000 sq. ft. rock board.
- (14) No. Cu. Yds. Concrete - 5928 Class A, building structure; Stack 170.3 cu. yds.
- (15) No. Bldg. Tile - 4250 - 5" x 8" 12" Buff Tile.
- (16) Sq. Roofing & Type - 107.0 sqs. Built-Up, 46.0 sqs. Water-proofed Concrete.
- (17) No. Tons Structural Steel - None.
- (18) Bldg. Services & Facilities - Raw water; filtered water; demineralized water; hot water; plumbing & drainage; toilet and washroom facilities; steam; steam heat; air; propane gas; process lines; sanitary and process sewers; air conditioning; forced draft ventilation; fume exhaust system; lighting 110 V, A.C., 60 C; power 220/440 V, 3 P, 60 C; and telephone.
- (19) Additions & Changes - Added: AUXILIARY ELECTRIC GENERATOR BUILDING-- Wood frame 12' 7" x 8' 7", 8' 0" eaves; rock board lining; exposed studding; concrete curtain wall foundation; concrete floor and built-up shed roof used to house one 5 Kw 110 V, A.C., 60 C, stand-by gasoline driven motor generator set; concrete fume exhaust duct on top of cells; and wood frame shed roof over loading platform.

(20) Major Bldg. Equipment

Start up date No. 1 Cell - December 15, 1943
Start up date No. 2 Cell - December 18, 1943
Start up date No. 3 Cell - December 22, 1943
Start up date No. 4 Cell - December 29, 1943
Start up date No. 5 Cell - January 5, 1944
Start up date Testing Laboratories - December 13, 1943
Start up date Exhaust Stack, Blowers and Duct System -
December 15, 1943
Start up date Mixing Room - December 20, 1943

The extractor equipment was composed of a centrifuge, large precipitator, catch tank, and small precipitator and was duplicated in Cells 2, 3 and 4. No. 5 Cell contained similar equipment but did not contain a catch tank and had 2 additional small precipitators. No. 1 Cell contained only a dissolver and condensing column.

Listed below is type and size of equipment installed in Cells 1 through 5:

- 1 Jacketed dissolver tank, 5' 0" O.D. x 5' 2" deep, 25/12 CB stainless steel
- 1 Condensing column, 16" O.D. x 9' 6 $\frac{1}{2}$ " high, 25/12 CB stainless steel
- 4 Jacketed precipitators, 7' 0" x 7' 0" O.D., 25/12 CB stainless steel with 5 H.P. motor reducers and agitators
- 4 40" Bird centrifuges, 25/12 CB stainless steel with 40/10 H.P., 1800/900 R.P.M., T.R.F.C., 2-speed, 440 V, 3 P motors and speed indicators
- 3 8' 0" O.D. x 6' 0" high catch tanks
- 3 Jacketed precipitators, 3' 0" x 5' 0" O.D., with $\frac{1}{2}$ H.P., 440 V, 3 P, 400 R.P.M. motor reducers and agitators
- 2 Jacketed precipitators, 3' 6" x 5' 6" O.D., with $\frac{1}{2}$ H.P., 440 V, 3 P, 400 R.P.M. motor reducers and agitators
- 1 Jacketed precipitator, 5' 0" x 3' 0" O.D., without motor reducers and agitator
- 6 Aerofin heaters
- 1 Mechanical bucket unloader

The Control Room contained weigh tanks, control panels for each cell, hydraulic, electrical, mechanical, and instrument controls, which are as follows:

- 2 1" All-iron chemical transfer pumps with 1 $\frac{1}{2}$ H.P., 440 V, 3 P, 60 C motors
- 1 Nitric acid weigh tank, 18/8 stainless steel
- 1 Water measuring tank, 3' 0" O.D. x 6' 0"
- 2 Chemical measuring tanks, 4' 9" O.D. x 4' 0", 25/12 CB stainless steel
- 2 4000# Platform scales
- 6 Chemical weigh tanks, 24" x 27", 25/12 CB stainless steel
- 6 1000# Platform scales

2 Feed tanks, 18" x 3' 0"
1 6000# scale

The equipment installed in the Mixing Room was mainly acid and chemical weigh tanks, which are as follows:

- 1 Cylinder tilter
- 1 Nitric acid storage tank 18/8 stainless steel
- 1 Nitric acid pump
- 1 Mix tank and scale
- 1 Caustic pump
- 1 Caustic dissolver
- 1 HF weigh tank and scale
- 1 Dichromate dissolver
- 1 Caustic tank
- 1 Solution tank, 5' 0" O.D. x 4' 6"
- 1 Dissolver tank, 5' 0" O.D. x 4' 6"
- 1 Solution pump
- 1 Acid mixed pump
- 1 Special cylinder pump
- 5 process mixed tanks and agitators
- 1 8' 0" x 8' 6" wood stave elevated water storage tank and pump
- 2 Miscellaneous acid pumps
- 4 Chemical pulse feeders

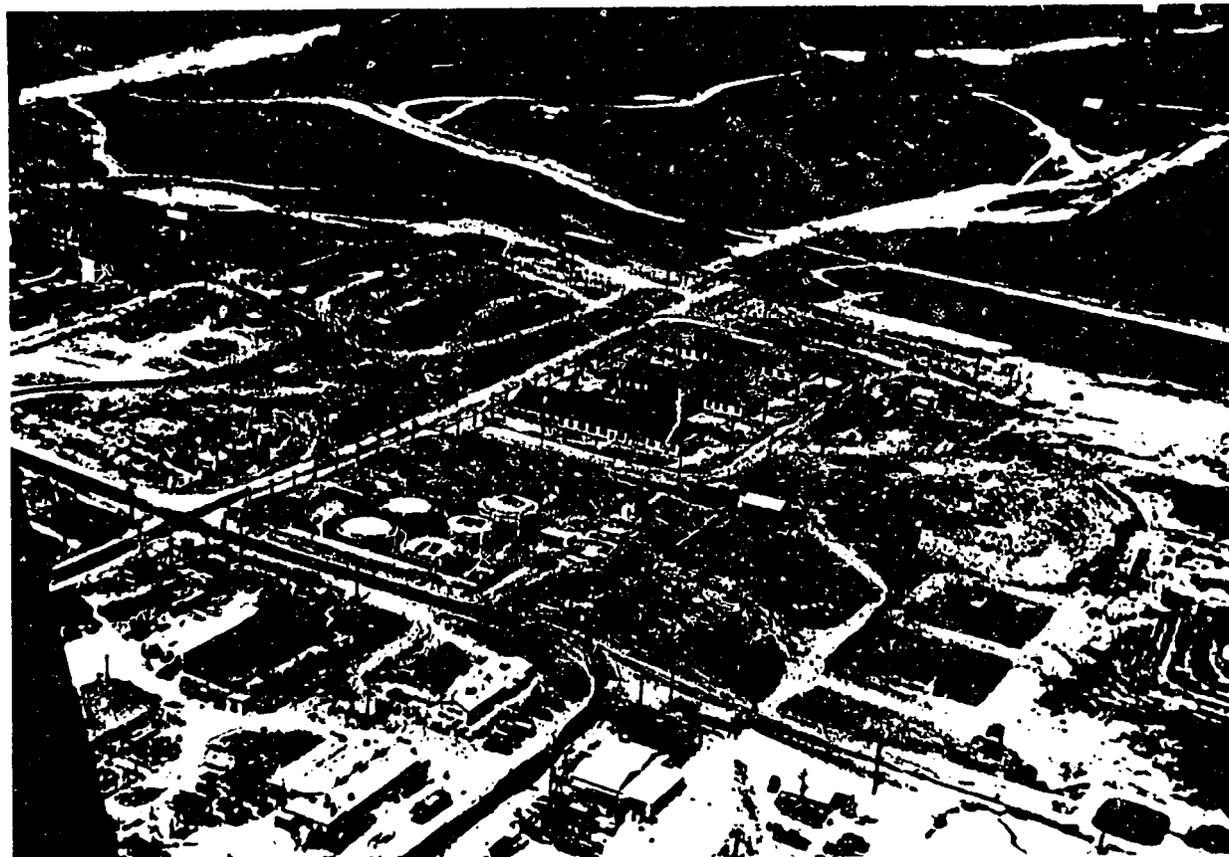
The Test Laboratory equipment installed was as follows:

- 1 26" Bird centrifuge, 25/12 CB stainless steel
- 2 Jacketed precipitation tanks with lightening mixers--30" x 42", 25/12 CB stainless steel
- 1 12" centrifuge
- 1 Internal #2 centrifuge
- 2 Transfer pumps
- 1 Water heater
- 1 Surge tank
- 1 Water pump
- 1 "Freon" compressor with 5 H.P. motor
- 1 Carrier ventilating unit
- 1 Air compressor
- 1 Vacuum pump
- 1 Water cooler
- Laboratory and office furniture and equipment, instruments, etc.

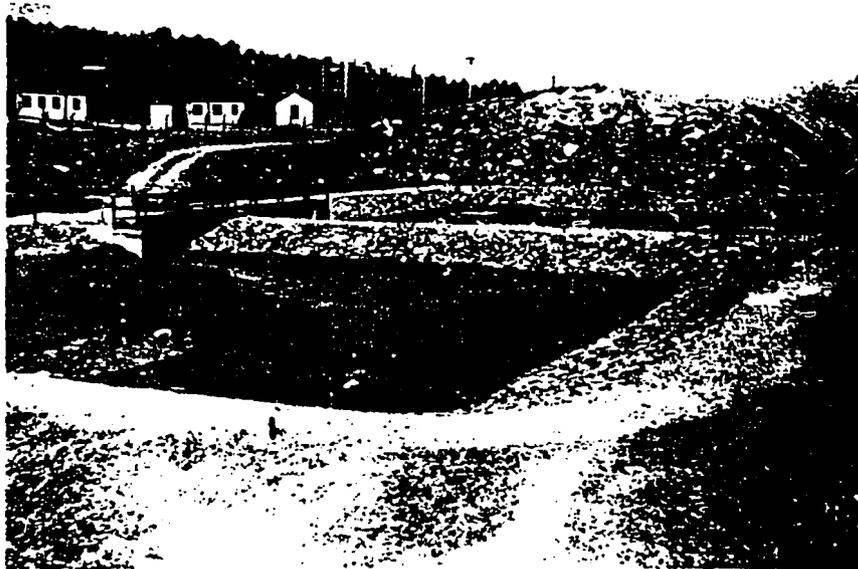
The Exhaust System was comprised of the following equipment:

- 1 Reinforced concrete and overhead sheet metal exhaust duct
- 1 Reinforced concrete tapered exhaust stack
- 2 #6 1/2 Type LL Buffalo Forge limit load fans with V-belt; one driven by 10 H.P., 440 V, motor; other driven by Troy type K steam engine

Note: The above list of equipment only includes major pieces of equipment installed and not the EM equipment purchased in connection with this building.



Aerial View of Plant Area - East Section
Looking Northeast
Project 9733
Clinton Engineer Works
Roll 76-13 Date 8-31-43



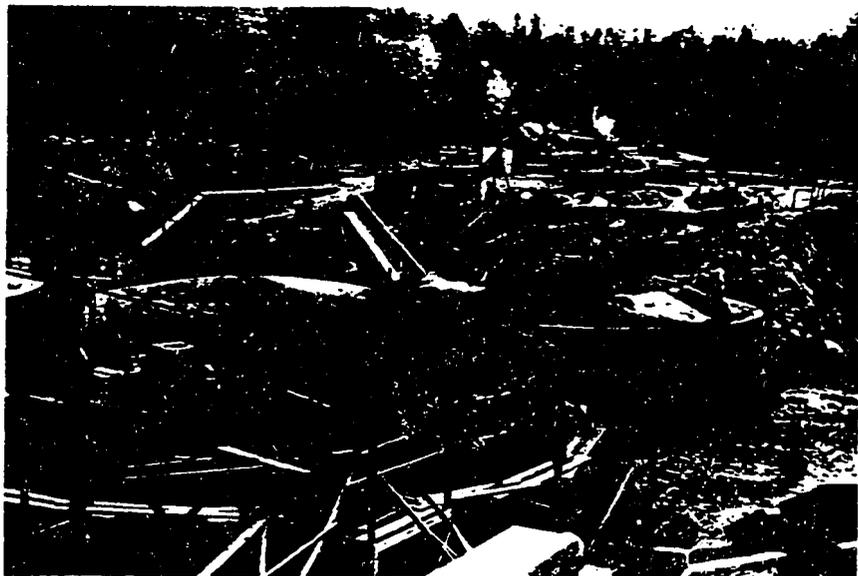
Cooling Water Ponds - Bldg. 206
Looking North East
Project 9733
Clinton Engineer Works
Roll 97-14 Date 10-11-43



Retention Basin - Bldg. 206
Looking South
Project 9733
Clinton Engineer Works
Roll 97-15 Date 10-11-43



Process Area Tank Farm - Bldg. 206
Looking North East
Project 9733
Clinton Engineer Works
Roll 44-24 Date 7-14-43



Process Area Tank Farm - Bldg. 206
Looking South East
Project 9733
Clinton Engineer Works
Roll 44-20 Date 7-14-43

[REDACTED]

MUNIMY BUILDING DATA

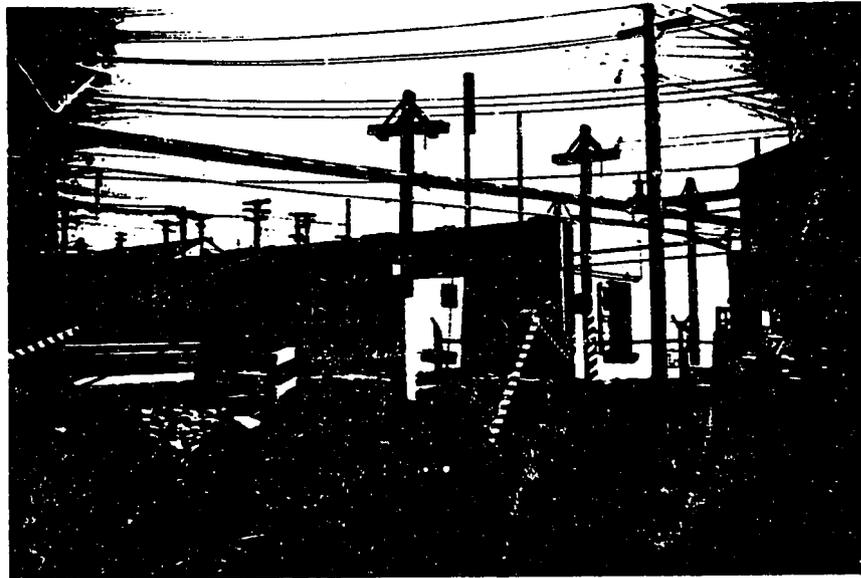
- (1) Building No. - 206
- (2) Name - PROCESS AREA TANK FARM
- (3) Date Construction Started - March 18, 1943
- (4) Date Start Up - December 5, 1943 (partial)
January 1, 1944 (all)
- (5) Date Acceptance Approved by CLINTON LABORATORIES - March 5, 1944
- (6) Date Construction Completed - January 1, 1944
- (7) Date Accepted by Government - March 9, 1944
- (8) Type of Construction - 11 underground pre-stressed (Cunite) tanks with circular suspended domes and two layers of membrane waterproofing and one layer Missal-Craft Paper between tank foundations and tank bottoms, and two rip-rapped earthfilled dyke cooling ponds and one retention basin with 18" gate valve outlets. The two 25' 0" and six 50' 0" tanks have an additional two layers waterproofing membrane in walls and tank bottoms. Also included are reinforced concrete plug valve and dry-vell boxes. Tank foundations are of concrete approximately 2' 0" thick.
- (9) Total Capacity of Tanks - 1,051,415 gallons
Total Capacity of Cooling Ponds and Retention Basins - 399,425 gallons
- (10) Total Volume of Tanks, Valve pits, Dry-ells, etc. - 247,819 cu. ft.
Total Volume of Cooling Ponds & Retention Basins - 124,275 gallons
- (11) Dimensions - Six 50' 0" Storage Tanks: Top of tank wall 15' 0", top of dome 20' 7", tank pad 18" thick, bottom 4 1/2" thick, walls 7 1/2" thick, top 10" thick.
Two 25' 0" Hold-Up Tanks: Top of tank wall 14' 6", top of dome 17' 6 1/2", tank pad 18" thick, bottom 3" thick, walls 6" thick, top 10" thick.
Two 12' 0" Hold-Up Tanks: Top of tank wall 7' 11", top of dome 9' 3" thick, walls 5" thick, top 3" thick.
One 8' 0" Hold-Up Tank: Top of tank wall 6' 0", top of dome 7' 3", tank pad 18" thick, bottom 3" thick, walls 5" thick, top 3" thick.

- (12) No. Tons of Stone Cushioning - 730 tons @ 2 ft.
- (13) No. Board Ft. Lumber - 18,000 bd. ft. total - 15,000 bd. ft. cribbing for foundation; 3,000 bd. ft. slatice boxes and walkways.
- (14) No. Cu. Yds. Concrete - 723 cu. yds. Class A; 1,078 cu. yds. Gunite.
- (15) Sqs. of Waterproofing - 415 sqs.
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Process sewers, steam, air, process drain lines, and telephone.
- (18) Additions & Changes - Added: One 8' 0" Hold-Up tank, Dry-well and Valve Box; additional 5" roof slabs for all 50' 0" Storage Tanks; and two courses of water-proof membrane 1 1/2" Gunite layer on bottom and walls of six 50' 0" Storage Tanks and two 25' 0" Hold-Up Tanks; also removed wooden outlet boxes and installed 16" Gate Valves in place.
- (19) Major Bldg. Equipment - Start up date for 1-12' 0", 2-25' 0", and 1-8' 0" Hold-Up Tanks and necessary Dry-well and plug valve boxes was December 5, 1943; and 6-50' 0" storage tanks, 2 cooling ponds, 1 retention basin, and pertinent dry-well and plug valve boxes was January 1, 1943.

The only mechanical equipment used in connection with the tank farms was miscellaneous safety and recording instruments, and sampling equipment.



Main Office Overflow Building - Bldg. 703-B
Looking East
Project 9733
Clinton Engineer Works
Roll 211-13 **Date 3-13-44**



Special Machine Shop - Bldg. 305
Looking Northeast
Project 9733
Clinton Engineer Works
Roll 211-10 **Date 3-13-44**

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 305 (Project 55)
- (2) Name - EXPERIMENTAL BUILDING
- (3) Date Construction Started - May 10, 1943
- (4) Date Start Up Experiments - Jan. 14, 1944 to Jan. 23, 1944
- (5) Date Original Experiments Completed - January 8, 1944
- (6) Date Additional Experimental Construction Completed - March 9, 1944
- (7) Date Additional Experiments Completed - Approximately March 31, 1944
- (8) Date Acceptance of Building Structure Approved by CLINTON LABORATORIES - March 20, 1944
- (9) Date Building Structure Accepted by Government - March 21, 1944
- (10) Type of Construction - 1 story wood frame structure with flat and shed roof sloped two ways with wooden roof ventilators; 1" T & G sheathing, decking, and drop siding with building paper insulation between siding and decking; studded partitions, one side covered with 1" rock board; reinforced concrete curtain wall foundation and reinforced concrete floor; wooden doors, windows and sash.
- (11) Dimensions - 96' 9" x 50' 0", height of eaves 19' 0", 18' 0" & 17' 9" head clearance.
- (12) Total Volume - 92,000 cu. ft.
- (13) Sq. Ft. Floor & Type - 4,850 sq. ft. concrete 4" thick.
- (14) No. Rooms - 5 - Experimental Room, 2 Offices, Shower & Locker Room, and Laundry.
- (15) No. Board ft. Lumber - Total 57,500 bd. ft. - 42,500 bd. ft. frame; 15,000 bd. ft. sheathing, decking, and drop siding; 1400 sq. ft. 1" rock board.
- (16) No. Cu. Yds. Concrete - 1.04 cu. yds.
- (17) Sq. Roofing & Type - 50 sqs. Built-Up Roofing.
- (18) No. Tons Structural Steel - None.

(19) Building Services & Facilities - Dust collecting system; steam heat; steam; air; toilet and washroom facilities; plumbing and drainage; sanitary sewers; raw water; filtered water; lighting 110 V, A.C., 60 C; power 220/440 V, 3 ϕ , 60 C; and telephone.

(20) Additions & Changes - added: 1 story wood frame lean-to Change House 12' 0" x 18' 0", 11' 0" eaves, 10' 0" ceiling, lined with 1/2" rock board; studded and board partitions for offices; and drop siding - See Field Change Request 700-15.

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 501
- (2) Name - Sub-Stations & Outside Electric Lines
- (3) Date Construction Started - April 1, 1943
- (4) Date Start Up - April 5, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 7, 1943
- (6) Date Construction Completed - November 12, 1943
- (7) Date Accepted by Government - December 10, 1943
- (8) Type of Construction - Outdoor sub-stations, overhead type line construction. Incoming service 11,500 volts, 3 phase, 60 cycle--T. V. A.
- (9) No. Sub-Stations - 3
- (10) Voltage, Primary & Secondary - 11,500/2300 V
- (11) Capacity - 2500 KVA

(12) Outside Electric Line Data

Wire Size		Wire Size	
500 MCM	Copper	1	Copper
350 MCM	"	2	"
4/0	"	4	"
2/0	"	6	"
1/0	"	6	Steel

(13) Sub-Station Data

Number	No. Transformers	P. Voltage	S. Voltage
EC1-A	3 - 250 KVA	11,500	2300
	3 - 200 KVA		
	3 - 15 KVA C.C.		
EC1-B	3 - 100 KVA	11,500	2300
	1 - 25 KVA		
EC1-C	3 - 200 KVA	11,500	2300

(14) Line Transformers

KVA RATING	2400/480/240/120
150	2
100	6
75	4
50	11
37½	10
25	3
15	2
10	6
7½	7

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 603
- (2) Name - Roads and Walks
- (3) Date Construction Started - February 10, 1943
- (4) Date Acceptance Approved by Clinton Laboratories - December 8, 1943, Additions - March 11, 1944
- (5) Date Construction Completed - December 7, 1943, Additions - March 8, 1944
- (6) Date Accepted by Government - December 10, 1943, Additions - March 17, 1944
- (7) Roads
 - (a) Type of Construction - Gravel: Coarse Gravel base 1½ to 3" size covered by ¾ to 1½" gravel and dust (graded up to ¾)
 - (b) Length & Width on Plant - .25 mile 12' width gravel, 1.00 mile 20' width gravel, .25 mile 30' width gravel
 - (c) Length & Width Off Plant - 1.0 mile 16' width gravel, 5.0 miles 20' width gravel
 - (d) Yards Surface & Type - 82000
 - (e) Size of Stone - Grading dust to ¾"; ¾" to 1½"; 1½" to 3"
 - (f) Drainage Structures - Reinforce Concrete Pipe and Wood Box Culverts
- (8) Walks - Length & Width on Plant - 7700 ft. 3' width gravel, 7300 ft. 4' width Gravel, 650 ft. 6' width gravel
 - (a) Type of Construction - Gravel: Topping of gravel chips

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 604
- (2) Name - TRUCK SCALE
- (3) Date Construction Started - June 10, 1943
- (4) Date Start-Up - July 27, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - September 28, 1943
- (6) Date Construction Completed - July 10, 1943
- (7) Date Accepted by Government - October 27, 1943
- (8) Type of Construction - Wood, steel and concrete, Howell Truck Scale
- (9) Dimensions 34' 0" x 10' 0" x 4' 5" Deep
- (10) Capacity - 30 Tons
- (11) Sq. ft. Floor & Type - 340 sq. ft. (wood planking on steel frame)
- (12) No. Board ft. Lumber - 794 bd. ft.
- (13) No. Cu. Yds. Concrete - 50 cu. yds.

SUMMARY BUILDING DATA

- (1) Building No. - 605
- (2) Name - FENCE
- (3) Date Construction Started - February 10, 1943
- (4) Date Start Up - April 20, 1943 (Outside Only)
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
March 16, 1944
- (6) Date Construction Completed - February 19, 1944
- (7) Date Accepted by Government - March 18, 1944
- (8) Type of Construction - Wood post spaced 10' O.C.
(No top bottom or intermediate rails)
- (9) No. Ft. & Types of Fence - 8900 Lin. Ft. Type 1
5000 Lin. Ft. Type 2
4950 Lin. Ft. Type 3
- (10) No. & Size of Post - 1190 4"x 4"x 8', 495 4"x 4"x 12'
- (11) Types of Wire - 4 point barbed wire on Types 1 & 2
Woven mesh on Type 3. (Not chain Link) Types
1 and 3 have barbed wire strands on extension
arms.
- (12) No. Gates - 14
- (13) No. Cu. Yds. Concrete - 10 cu. yds.

PROPERTY FILE - 1930-1945

- (1) Building No. - 612
- (2) Name - DRAINAGE SYSTEM
- (3) Date Construction Started - March 18, 1943
- (4) Date Start Up - July 1, 1943
- (5) Date Acceptance Approved by CIVIL ENGINEER -
December 8, 1943, Addition - March 11, 1944
- (6) Date Construction Completed - November 13, 1943
Addition - March 8, 1944
- (7) Date Accepted by Government - December 10, 1943
Addition - March 18, 1944
- (8) Type of Construction - Earthwork
- (9) Length and Size - 2700' - Bottom approximately 2' 0"
wide, side wall slopes 2.5 to 1, minimum depth
1' 0", maximum depth 3' 0"
500' - Channeling channel White Oak Creek, approxi-
mate depth 3' 0"

SUMMARY BUILDING DATA

- (1) Building No. - 613
- (2) Use - Permanent Parking Lot
- (3) Date Construction Started - March 20, 1943
- (4) Date Start-Up - May 1, 1943
- (5) Date Acceptance Approved by Clinton Laboratories -
December 8, 1943
- (6) Date Construction Completed - August 20, 1943
- (7) Date Accepted by Government - December 10, 1943
- (8) Type of Construction - Crushed Limestone Surfaced Approx.
8" Thick
- (9) Dimensions - 1 - 250' x 125', 2 - 100' x 25', 1 - 250' x 20',
1 - 250' x 50'
- (10) Total Car Capacity - Approximately 200
- (11) Area - 6000 Sq. Yds.

SUMMARY BUILDING DATA

- (1) Building No. - 614
- (2) Name - S-GUARD TOWERS
- (3) Date Construction Started - April 1, 1943
- (4) Date Start Up - July 15, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - November 22, 1943
- (6) Date Construction Completed - October 1, 1943
- (7) Date Accepted by Government - November 30, 1943
- (8) Type of Construction - Wood frame observation booth with shed roof, 1" T & G double decked roof & floor 1" drop siding, 1/4" fibre board lining, and having floor elevation 14' 0" above ground.
- (9) Dimensions - 6' 9 1/2" x 6' 9 1/2" 23' 0" high, 8' 2 1/2" ceiling.
- (10) Total Volume - 1874.30 cu. ft.
- (11) Sq. Ft. Floor & Type - 196 sq. ft. T & G
- (12) No. Rooms - 1
- (13) No. Board Ft. Lumber - 11,000 bd. ft. total, 1500 bd. ft. sheathing, 1500 bd. ft. drop siding, 8000 bd. ft. frame.
- (14) No. Cu. Yds. Concrete - 24 cu. yds.
- (15) Sq. Roofing 5.2 sqs. Built-Up
- (16) No. Tons Structural Steel - None.
- (17) Electrical Services - Electric heat, Lighting 110 V, A.C., Telephone.
- (18) Additions & Changes - 1-Guard Tower Added
- (19) Major Building Equipment - 5-1000 Watt Incandescent Search Lights 5-Electric Space Heaters.

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 615
- (2) Name - FENCE LIGHTING (and Roads)
- (3) Date Construction Started - April 7, 1945
- (4) Date Start Up - July 1, 1945
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 12, 1945
- (6) Date Construction Completed - October 8, 1945
- (7) Date Accepted by Government - December 17, 1945
- (8) Type of Construction - Fence lighting fixtures with 8' 0" brackets on 35' 0" Class "B" wood pole & poles placed 8' 6" inside fence and bottom of fixture 25' 0" above ground level.
- (9) Total Distance - 15,718 ft. (fence), 4451 (roads)
- (10) No. Lights - 121 (fence) and 29 (road)
- (11) No. Poles - 157
- (12) No. Ft. & Type of Wire - 22000 ft. #6 BWC; Road lighting fixtures with 4' 0" brackets on 35' 0" class "B" wood pole, center line poles placed 10' 0" from edge of road with 25' 0" clearance to top of bracket.

SUMMARY BUILDING DATA

- (1) Building No. - 622
- (2) Name - Overhead Steam Lines
- (3) Date Construction Started - June 19, 1943
- (4) Date Start Up - August 11, 1943
- (5) Date Acceptance Approved by Clinton Laboratories -
January 26, 1944
(a) Date Acceptance Approved by Clinton Laboratories -
1st Addition - March 11, 1944
- (6) Date Construction Completed - October 1, 1943
(a) Date Construction Completed 1st Addition -
March 7, 1944
- (7) Date Accepted by Government - March 9, 1944
(a) Date Accepted by Government - 1st Addition -
March 18, 1944
- (8) Type of Construction - Overhead welded and suspended type
of construction in hanger suspended on rods from wood
cross arms attached to wood poles with all steam mains
having horizontal expansion V bends.
- (9) Size and Lengths of Lines -

1½"	- 125#	460 ft.
2"	- 125#	120 ft.
3"	- 125#	2800 ft.
4"	- 125#	1040 ft.
6"	- 125#	1850 ft.
8"	- 125#	940 ft.
- (10) Average Height Above Ground - 12'0" - 15'0" at road crossings
- (11) Type of Insulation - Class 4, Outside 85% Magnesia with tar
paper covering
- (12) No. Cu. Yds. Concrete - 18 Cu. Yds.
- (13) No. Tons Structural Steel - None

SUBGLARY BUILDING DATA

- (1) Building No. 635
- (2) Name - UNDERGROUND WATER LINES
- (3) Date Construction Started - March 31, 1943
- (4) Date Start Up - July 17, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
December 7, 1943
Additions - March 18, 1944
- (6) Date Construction Completed - September 30, 1943
Additions - March 9, 1944
- (7) Date accepted by Government - December 10, 1943
Additions - March 18, 1944
- (8) Type of Construction - Class 150, Cast iron pipe. All sizes
over 3" diameter Galvanized Steel - 3" Diameter and
under.
- (9) Length and Size of Lines -
 - 16" - River Water - 21,860 ft.
 - 12" - Raw Water - 1,114 ft.
 - 6" - Raw Water - 1,395
 - 4" - Raw Water - 25 ft.
 - 3" - Raw Water - 248 ft.
 - 2" - Raw Water - 793 ft.
 - 1" - Raw Water - 58 ft.

 - 8" - Filtered Water - 932 ft.
 - 6" - Filtered Water - 2229 ft.
 - 4" - Filtered Water - 644 ft.
 - 3" - Filtered Water - 950 ft.
 - 2" - Filtered Water - 867 ft.
 - 1" - Filtered Water - 368 ft.
 - 1" - Filtered Water - 67 ft.

 - Water - 735 ft.
 - Water - 148 ft.
- (10) Average Depth Below Ground - 3' 6" Minimum Depth
- (11) No. Cu. Yds. Concrete - 703

SUMMARY BUILDING DATA

- (1) Building No. - 624
- (2) Name - AIR LINE
- (3) Date Construction Started - June 19, 1943
- (4) Date Start Up - August 23, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
March 6, 1944
1st Addition - March 18, 1944
- (6) Date Construction Completed - February 18, 1944
1st Addition - February 10, 1944
- (7) Date Accepted by Government - March 2, 1944
1st Addition - March 18, 1944
- (8) Type of Construction - Suspended Overhead welded and bolted.
Construction carried on pipe hanger and rods from
pipe supports 631.
- (9) Length and Size of Lines - 8" - 400 ft.; 1 1/2" - 2420 ft.;
2" - 100 ft.; 3" - 1180 ft.; 4" - 1060 ft.
- (10) Working Pressure - 100# per sq. in.
- (11) Total Consumption - 275 C.F.M.
- (12) Average Height Above Ground - 12' 0"
- (13) Insulation - None except steam-chased air traps which have
85% Magnesium Insulation.

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 625
- (2) Name - Sewer & Septic Tanks
- (3) Date Construction Started - April 15, 1943
- (4) Date Start Up - May 1, 1943
- (5) Date Acceptance Approved by Clinton Laboratories -
December 8, 1943, Additions - March 11, 1944
- (6) Date Construction Completed - September 30, 1943
Additions - March 6, 1944
- (7) Date Accepted by Government - December 10, 1943
Additions - March 18, 1944
- (8) Type of Construction - Underground Sanitary Process
- (9) Length & Size of Sewers

2600 ft.	15" V.C. Pipe
150 ft.	12" V.C. Pipe
50 ft.	10" V.C. Pipe
2600 ft.	8" V.C. Pipe
1500 ft.	6" V.C. Pipe
34	Manholes
650 ft.	6" Chemicalware
160 ft.	4" Chemicalware
300 ft.	3" Chemicalware
- (10) No. Septic Tanks & Size

One	26' x 12' x 9'6"
One	22' x 10' x 9'0"
- (11) Capacity of Septic Tanks

One	6'0" Side Water Depth - 1872 cu. ft.
One	5'6" Side Water Depth - 1672 cu. ft.
- (12) [REDACTED] Below Ground - 3'6" to Water Level
- (13) [REDACTED] Lumber - 17000 Ft. B.M.
- (14) No. Cu. Yds. Concrete - 2275
- (15) Sq. Roofing - 107
- (16) Bldg. Services - Filtered Water
Electric 220/110 volt Lighting Service
Electric Heater 2 KW, 230 V

- [REDACTED]
- (17) Disinfection and Odor Control - "Infilco" Chemical Solution Feeders Type ASO.
 - (18) Type of Joints - Open, Acid Proof, Cement and Concrete encased
 - (19) Headwalls - 3 Timber; 3 Standard CLC

SUMMARY BUILDING DATA

(1) Building No. - 628

(2) Name & PROCESS LINES

(3) Date Construction Started - June 16, 1943

(4) Date Start Up - November 5, 1943

(5) Date Acceptance Approved by CLINTON LABORATORIES -
February 1, 1944

(6) Date Construction Completed - October 30, 1943

(7) Date Accepted by Government - February 2, 1944

(8) Type of Construction - Underground partially encased in
concrete, welded and screwed piping with the installation
of several overhead S/S drain lines in the
Exhaust Area.

(9) Length & Size Oxygen Lines - 170 ft. 1" Screwed

(10) Length & Size Peroxide Lines - 450 ft. 1/2" S/S

(11) Length & Size S/S Waste Lines - 2520 ft. 3" S/S Welded
265 ft. 2" S/S Welded

(12) Length & Size Calgon Lines - 225 ft. 1/2" S/S

(13) Length & Size Hot Water Lines - 100 ft. 3/4" Magnesium
Insulation

(14) Length & Size Demineralized Water Lines - 405 ft. 2" S/S
8" Ric-Wil Insulation

(15) Average Height Above Ground - 12' 0"

(16) Average Height Below Ground - 3' 6"

(17) Concrete - 532 cu. yds.

[REDACTED]

SUMMARY BUILDING DATA

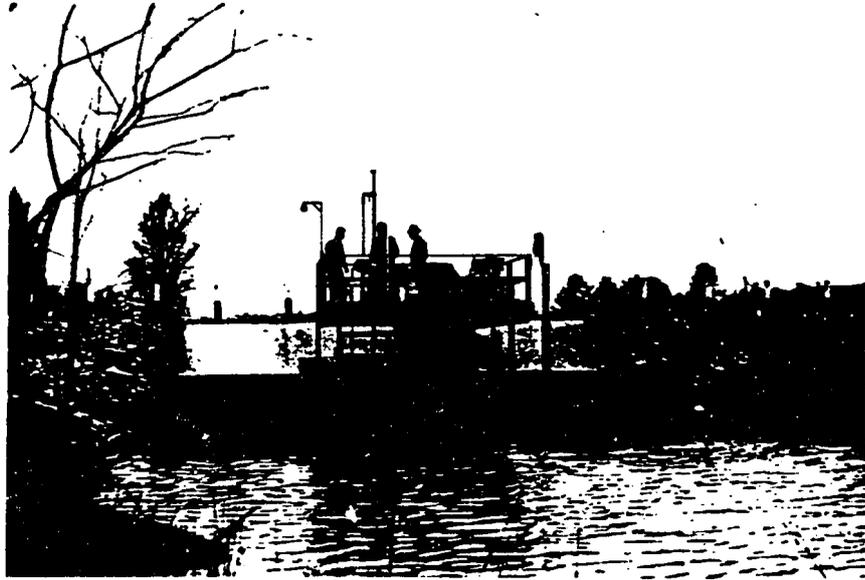
- (1) Building No. - 630
 - (2) Name - FIRE LINES
 - (3) Date Construction Started - April 17, 1943
 - (4) Date Start Up - July 27, 1943
 - (5) Date Acceptance by CLINTON LABORATORIES -
December 8, 1943, Addition - March 11, 1944
 - (6) Date Construction Completed - December 7, 1943
Addition - March 5, 1944
 - (7) Date Accepted by Government - December 10, 1943
Addition - March 20, 1944
 - (8) Type of Construction - Underground Construction -
C.I. pipe laid 4' 0" minimum depth.
 - (9) Length and Size of Lines - 7125' - 8" - 1850' - 6"
1425' - 4"
 - (10) No. Hydrants - 17 Mathews Modernized AWWA, 5" valve
open, 6 Bell, 2 - 2 1/2" Hose Cutlets, National
Standard Threads 4 ft. Bury.
 - (11) Valves - 20 - 8", 3 - 5", 14 - 4", Chapman
 - (12) No. Board Ft. of Lumber - Hydrant Houses 13 M'EM
 - (13) No. Cu. Yds. Concrete - 85 cu. yds.
 - (14) Sq. Roofing and Type - 4 square of 90% roll roofing.
- [REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 631
- (2) Name - OUTSIDE OVERHEAD LINE SUPPORTS
- (3) Date Construction Started - June 1, 1943
- (4) Date Start Up - July 27, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
February 1, 1944 - 1st Increase March 15, 1944
- (6) Date Construction Completed - December 20, 1943
1st Increase February 12, 1944
- (7) Date Accepted by Government - February 1, 1944
1st Increase March 20, 1944
- (8) Type of Construction - Class 3 and 4 untreated cedar and
pine poles, 12" to 14" diameter at the butt, roofed
and gabled, doubled 3" x 6" wooden cross arms sit
2' 0" below top of pole, strap iron braces for cross
arms sit in concrete.
- (9) No. Pole Supports - 335 - 30' 0" - 30 - 35' 0"
- (10) Average Height Above Ground - 20' 0"
- (11) Average Depth - 5' 0"
- (12) Average Spacing - 16' 0"
- (13) No. Cu. Yds. Concrete - 109 cu. yds.
- (14) No. Tons Structural Steel - None



Aerial View of Dam & Sluice Gate - Bldg. 632
White Oak Creek Dam
Looking East
Project 9735
Clinton Engineer Works
Roll 206-22 Date 3-10-44



Dam and Sluice Gate - Bldg. 638
White Oak Creek Dam
Looking West
Project 9733
Clinton Engineer Works
Roll 18 Date 3-19-44

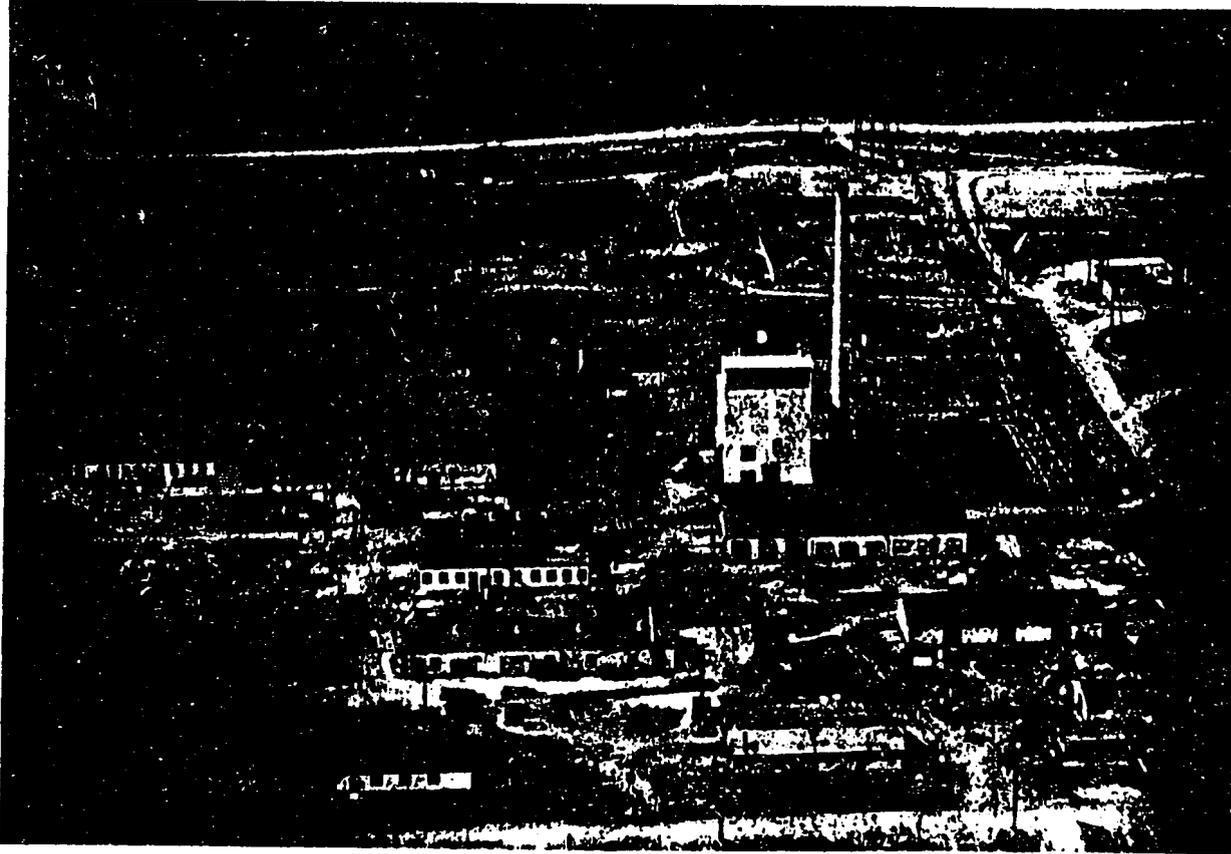


Dam and Sluice Gate - Bldg. 638
White Oak Creek Dam
Looking North
Project 9733
Clinton Engineer Works
Roll 19 Date 3-17-44

[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 632
- (2) Name - WHITE OAK CREEK DAM
- (3) Date Construction Started - September 6, 1943
- (4) Date Start Up - November 22, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
November 9, 1943
- (6) Date Construction Completed - November 20, 1943
- (7) Date Accepted by Government - February 2, 1944
- (8) Type of Construction - Concrete and sheet piling U shaped
wall around the upstream side of reinforced concrete
drainage structure in earth roadway embankment.
- (9) Dimensions - 35' 0" long x 21' 0" wing walls - 19' 0"
maximum storage depth.
- (10) Storage Area - 100 acre ft. (approx.)
- (11) No. Cu. Yds. Concrete - 78 cu. yds.
- (12) No. Tons Structural Steel - 43.4 Tons ME 32 Interlocking
Steel Piling
- (13) Additions & Changes - Sampling Device Added
- (14) Major Equipment - 2 Gates - 48" x 72" Steel Slide Gates.



Aerial View of 300, 700 & 800 Areas
Looking North
Project 9733
Clinton Engineer Works
Roll 206-30 Date 3-10-44

PRIMARY BUILDING DATA

- (1) Building No. - 701-A
- (2) Name - CLOCK ALLEY & LABORATORY
- (3) Date Construction started - March 3, 1943
- (4) Date Start Up - October 11, 1943
- (5) Date acceptance Approved by CLINTON LABORATORIES for Original Building - December 7, 1943
Date Acceptance Approved by CLINTON LABORATORY for First Addition - February 1, 1944
- (6) Date Construction Original Building Completed - November 4, 1943
Date Construction First Addition Completed - January 1, 1944
- (7) Date Original Building Accepted by Government - December 9, 1943
Date First Addition Accepted by Government - February 2, 1944
- (8) Type of Construction - 2 story wood frame building with 1 story lean-to clock alley on the south side, 1 story guard inspection bay on the west side and an outside wooden stairway and compressor room on the north side; concrete curtain wall foundation; wood and concrete floors; shed roofs covered with Build-Up roofing; 1" T & G sheathing, decking, and drop siding with building paper insulation between the siding and decking; rock board ceiling, lining, and partitions second floor and first floor ceiling main structure; wooden doors, frames and sash; and laboratory room insulated with 4" rock wool.
- (9) Dimensions - Main Structure 33' 4" x 17' 0", 21' 0" & 20' 0" eaves, 9' 0" ceiling.
Additional Clock Alley 33' 4" x 8' 2", 10' 0" eaves, 9' 0" ceiling.
Bay 4' 8" x 9' 0", 11' 0" eaves.
Compressor Room 4' 0" x 4' 0", 4' 0" high.
- (10) Total Volume - 18,807 cu. ft.
- (11) Sq. Ft. Floor & Type - 902 sq. ft. concrete 4" thick;
375 sq. ft. 1" T & G wood floor.
- (12) No. Rooms - 10 - Three Clock Alleys, two Guard Inspection rooms, Laboratory, Office, Dark room, Equipment room, and Toilet room.

- (13) No. Board Ft. Lumber - Total 13,950 Bd. Ft. - 5200 bd. ft. sheathing, decking, flooring, and siding; 11,750 bd. ft. frame; 3000 sq. ft. 1" rock board.
- (14) No. Cu. Yds. Concrete - 30 cu. yds.
- (15) Sq. Roofing & Type - 10.2 sqs. Built-up Roofing.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; air; air conditioning; filtered water; hot water; plumbing and drainage; toilet and washroom facilities; sanitary sewers; lighting 110 V, A.C., 60 C; power 24 V, D.C., for Master Time Clock, and 440 V, 3 ϕ , 60 C; and telephone.
- (18) Additions & Changes - Added: Second Floor, Laboratory Section, facilities, equipment, Outside Stairway, and Compressor Room.

First Addition: Third Clock Alley and equipment.

- (19) Major Bldg. Equipment - Start up date Clock Alley equipment - October 11, 1948; Start up date Laboratory equipment - November 3, 1948.

The type of equipment installed in this building was mainly clock alley, laboratory, and building service equipment which was as follows:

3 I.B.M. impulse time clocks and card racks.

3 Field-constructed turnstiles.

1 Carrier type 39 1 air conditioning unit with 1/3 H.P. - 1750 RPM single ϕ , 60 C, 110 V motor.

1 Compressor - York Ice Machine Co. - Model 2T68, with 3 H.P. - 1750 RPM, 3 ϕ , 60 C, 440 V motor.

1 Electric hot water heater, 30 to 40 gallon per hour, 440 V.

Dark room equipment and developing unit, laboratory cases, tables, desks, files, equipment, etc.

PRIMARY BUILDING DATA

- (1) Building No. - 701-B
- (2) Name - GUARD HOUSE
- (3) Date Construction Started - March 19, 1943
- (4) Date Start Up - December 5, 1943
- (5) Date Acceptance Approved by CLIFTON LANGE FORTS - November 12, 1943
- (6) Date Construction Completed - August 15, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction - 1 story wood frame building with concrete curtain wall foundation; concrete floor; shed roof; 1" T & G sheathing, decking and drop siding with building paper insulation between siding and decking; and wooden frames, doors and sash.
- (9) Dimensions - 9' 2 1/2" x 10' 0", 11' 0" & 10' 7" eaves, 9' 7" head clearance.
- (10) Total Volume - 1288 cu. ft.
- (11) Sq. Ft. Floor & Type - 80 sq. ft. concrete 4" thick.
- (12) No. Rooms - 1
- (13) No. Board Ft. Lumber - 1100 bd. ft. total - 800 bd. ft. sheathing, decking, and drop siding; 500 bd. ft. frame.
- (14) No. Cu. Yds. Concrete - 6 cu. yds.
- (15) Sq. Roofing & Type - 1.15 sqs. Built-Up Roofing.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - team heat; steam; lighting 110 V, A.C., 60 C; and telephone.
- (18) Additions & Changes - None.
- (19) Major Building Equipment - None.

(19) Building Services & Facilities - Dust collecting system; steam heat; steam; air; toilet and washroom facilities; plumbing and drainage; sanitary sewers; raw water; filtered water; lighting, 110/220 V, A.C., 60 C, power 220/440 V, 3 ϕ , 60 C; and telephone.

(20) Additions & Changes - Added: 1 story wood frame lean-to Change House 12' 0" x 16' 0", 11' 0" eaves, 10' 0" ceiling, lined with 1/2" rock board; studded and board partitions for offices; and drop siding - See Field Change Request 700-15.

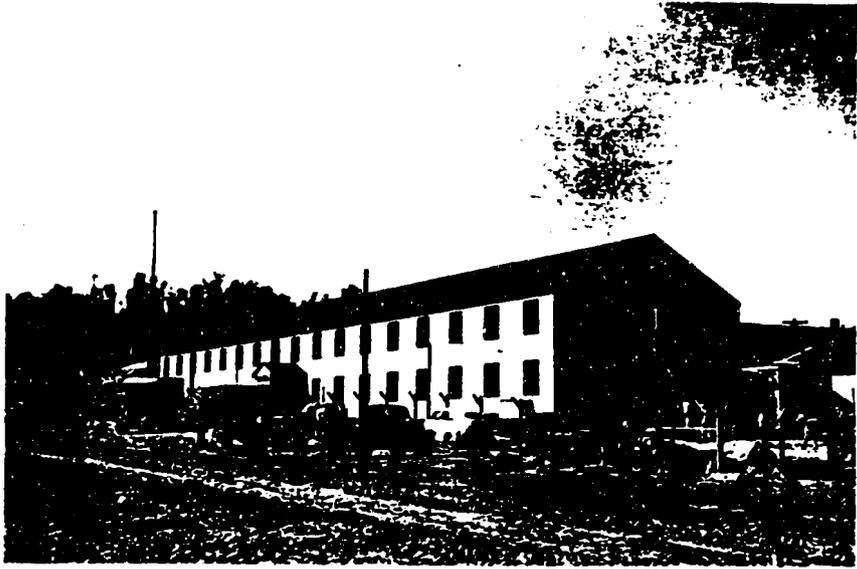
SUMMARY BUILDING DATA

- (1) Building No. - 702
- (2) Name - TELEPHONE SYSTEM & FIRE ALARM SYSTEM
- (3) Date Construction Started - April 25, 1943
- (4) Date Start Up Telephone System - May 1, 1943
- (5) Date Acceptance Telephone System Approved by CLINTON LABORATORIES - March 24, 1944
- (6) Date Telephone System Completed - January 5, 1944
- (7) Date Telephone System Accepted by Government - March 24, 1944
- (8) Type of Construction - The plant telephone system consisted of a three position switch board located in the 703 Administration Building and approximately 240 telephones with approximately 92 extensions. The plant switch board is connected with Clinton Engineer Works main switch board located in the Area Engineer's Office and is served by two county lines, three direct Knoxville lines, and two Clinton Engineer Works lines. The type of construction used within the plant site was restricted mainly to overhead cable supported by existing power and light poles, thus reducing setting of telephone poles to a minimum of approximately six poles. Open iron wire lines were used only from end of main cable at 706-A to the 807 and 115 Buildings. Twisted pair lines were run from the main service cable to the outside telephones located in the 806 Tank Farm Area. A minimum of 40" was maintained between telephone lines and other lighting and power services carried on the same poles, and a minimum clearance of 18 ft. was maintained along roadways and over all roads. Cable terminal boxes were mounted on poles and outside of buildings in order to be serviced without disrupting work in process buildings and laboratories. All wiring and telephone installation was done by the Southern Bell Telephone and Telegraph Company.
The fire alarm system consisted of approximately 13 Gamewell boxes located at the base of poles at various locations in the field and were connected by open wire system to an indicating panel and alarm system in the Patrol and Fire Headquarters Building.
- (9) Additions & Changes - During the latter part of construction, the Area Engineer authorized the installation of an automatic dial telephone system, 200 telephone

capacity, to replace the manually-operated three position switch board. The dial system was installed by the Eastern Electric Company.

At the close of construction, the temporary open wire telephone system in the temporary construction area was left standing and transferred to Clinton Laboratories. The lines and telephone equipment furnished by the Southern Bell Telephone and Telegraph Company for temporary construction service were likewise transferred from construction service to service for the Operating Department.

(10) Major Bldg. Equipment - None not previously mentioned in part (8).



Main Office Building - Bldg. 703
Looking Northeast
Project 9728
Clinton Engineer Works
Roll 80-4 Date 8-1-48

8-1-48



Laboratory - Bldg. 704-B
Looking Southeast
Project 9728
Clinton Engineer Works
Roll 87-8 Date 10-11-48



SUMMARY BUILDING DATA

- (1) Building No. - 703-A
- (2) Name - ADMINISTRATION BUILDING
- (3) Date Construction Started
Original Building - March 4, 1943
First Addition - October 16, 1943
- (4) Date Start Up
Original Building - May 1, 1943
First Addition - November 27, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES
Original Building - November 13, 1943
First Addition - February 1, 1944
- (6) Date Construction Completed
Original Building - September 1, 1943
First Addition - November 30, 1943
- (7) Date Accepted by Government
Original Building - November 17, 1943
First Addition - February 2, 1944
- (8) Type of Construction - 2 story wood frame T-shaped structure with 1 & 2 story concrete and brick vaults and telephone room connected to the east side of the main structure by 1 & 2 story wood frame annexes; concrete block with spread footings, concrete wall and pier with spread footing foundations; reinforced concrete beam supported floor slabs and concrete floors in the brick structures, wood floors in the main structure; 1" T & G sheathing, decking and drop siding with building paper insulation between siding and decking; 12" brick walls; gable and reinforced concrete roof slabs covered with asphalt shingles and built-up roofing; rock board studded partitions on west side; gypsum board ceiling; 2 inside side wooden stairways; and wooden doors, windows with shutters and louvers.
- (9) Original Structure - 205' 0" x 40' 0", 22' 0" eaves, 10' 0" gable, 9' 0" ceilings.
Vault 14' 0" x 16' 0", 14' 0" eaves, 9' 5" ceiling.
Annex 6' 8" x 30' 0", 13' 0" eaves, 8' 6" ceiling.
Main Entrance Vestibule 8' 0" x 14' 0", 13' 4" eaves, 2' 9" gable, 9' 0" ceiling.
2 Stoops 6' 0" x 5' 0", 4' 4" high.
First Addition - 50' 0" x 39' 8", 21' 0" eaves, 10' 0" gable, 9' 0" ceilings.

Vault and Telephone Room 26' 0" x 20' 0", 22' 4" eaves, 8' 6" & 7' 7" minimum ceiling.
 Annex 21' 0" x 16' 0", 21' 0" eaves, 9' 0" minimum ceiling, 4' 0" gable.
 Stair 5' 0" x 5' 0", 3' 0" high

(10) Total Volume - 818,885 cu. ft.

(11) Sq. Ft. Floor & Type - 1,115 sq. ft. concrete 4" thick; 19,854 sq. ft. 1" T & G wood floor of which 3,760 sq. ft. is covered with Battleship Linoleum.

(12) No. Rooms - 82 - 65 Office, 2 Vaults, 2 Men's and 2 Women's Toilet Rooms, 1 Women's Lounge, 1 Telephone Exchange Room, 3 Janitor's Closets, 5 Vestibules, 3 Annex Passageway Rooms.

(13) No. Board Ft. Lumber - Total 168,700 bd. ft.

<u>Dr Pent</u>	<u>Subcontractor</u>
3,500 bd. ft. drop siding	10,600 bd. ft. drop siding
6,800 bd. ft. sheathing	20,350 bd. ft. sheathing
8,250 bd. ft. 1" T & G flooring	18,200 bd. ft. 1" T & G flooring
33,000 bd. ft. frame	65,000 bd. ft. frame
21,500 sq. ft. 3/8" gypsum board	575 sq. ft. 1/2" ceiling
36,500 sq. ft. 1/2" rock board	

(14) No. Cu. Yds. Concrete - 184 cu. yds. total, 46 cu. yds. furnished by contractor.

(15) No. Brick & Concrete Blocks - 46,230-2" x 4" x 8" Red Common brick; 2,560-8" x 8" x 16" concrete blocks; 310-12" x 8" x 16" concrete blocks.

(16) Sq. Roofing - 9.32 sqs. Built-Up, 126.74 sqs. Asphalt Shingles.

(17) No. Tons Structural Steel - None

(18) Major Equipment & Facilities - Steam heat; steam; fire protection system; raw water; filtered water; hot water; sewer; toilet and washroom facilities; plumbing; drainage; ventilating system; lighting 110 V, 60 C; power 220/440 V, 12 V, D.C. to Master Control; and telephone.

(19) Additions & Changes - Added: First Addition consisting of a 2 story wood frame wing on the east side and 3 story brick and concrete vault and telephone exchange system; shower and locker room facilities; exhaust, fans and louvre houses; toilet room exhaust system; fire hose stations; and additional doors and partitions.

(20) Major Bldg. Equipment -

Start up date attic exhaust fans - July 1, 1943

Start up date other exhaust fans - November 28, 1943

Furniture list completed - August 1, 1943

There were only two types of equipment installed in this building, office furniture and building service equipment, which are as follows:

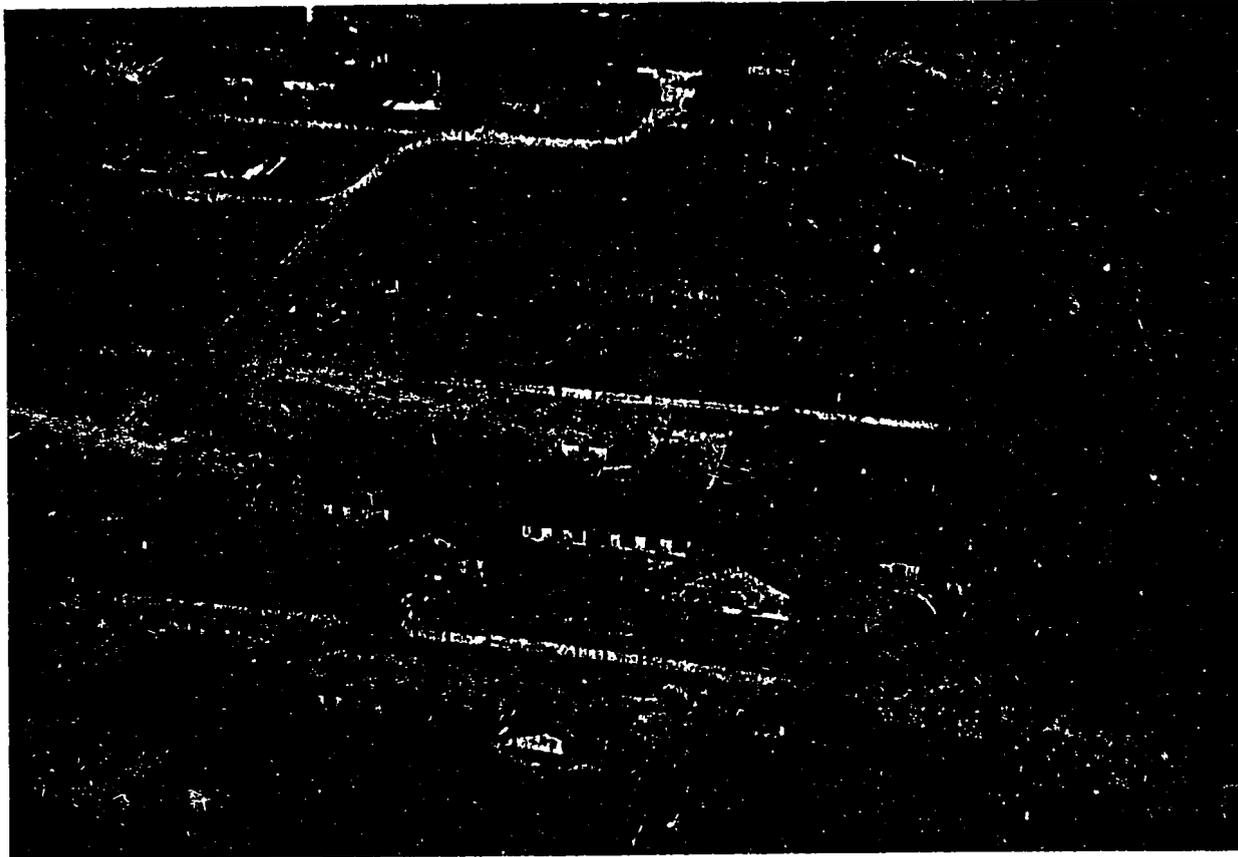
1 Paterson-Kelley hot water heater and controls

2 Buffalo 38" pulley-driven Breeze disc fans,
10,000 C.F.M. with $1\frac{1}{2}$ H.P., 780 R.P.M.,
440 V, 3 P, 60 C motors

1 12" Type NV Hevi-duty Buffalo Forge wall exhaust fan with $1\frac{1}{20}$ H.P., 1140 R.P.M.,
110 V, single P, 60 C motor

1 #1 HS ready unit up-blast discharge fan complete with $1\frac{1}{8}$ H.P., 1150 R.P.M., 110 V,
1 P, 60 C motor

Miscellaneous office furniture and equipment



Aerial View of Main Laboratory - Bldg. 700-A
Looking North
Project 9700
Clinton Engineer Works
Roll 200-22 **Date 3-10-44**

SUMMARY BUILDING DATA

- (1) Building No. 706-A
- (2) Name CLINTON LABORATORIES
- (3) Date Construction Started
Original Building - May 5, 1943
First Addition - December 20, 1943
- (4) Date Start Up
East End - August 22, 1943
West End - September 15, 1943
First Addition - February 12, 1944
- (5) Date Acceptance Approved by CLINTON LABORATORIES
Original Building - November 11, 1943
First Addition - December 20, 1943
- (6) Date Construction Completed
Original Building - October 20, 1943
First Addition - February 17, 1944
- (7) Date Accepted by Government
Original Building - November 17, 1943
First Addition - February 17, 1944
- (8) Type of Construction - 1 & 2 story concrete and wood frame structure composed of three 1 story gabled north and south wings which were interconnected by similar cross-sections divided by 12" brick fire walls. A 1 & 2 story wood and concrete frame structure having a combination flat and shed roof is attached to the east side of the east wing. The 2 story section houses four reinforced concrete explosion-proof test chambers of which the upper portion is accessible by means of a mezzanine floor. The middle wing is T-shaped due to the addition of a Change House on the north end. The east and west wings contain five reinforced concrete explosion-proof laboratory rooms having reinforced concrete floors, walls and roofs 2' 0" thick. Foundations composed of reinforced concrete walls and spread footings, reinforced concrete slabs and curtain walls. Siding used was of 1" horizontal and drop siding with building paper insulation between, with the exception of the exposed concrete walls of the explosion-proof and test laboratories. Gabled roofs were covered with asphalt shingles, and flat roofs and shed roofs were covered with Built-Up roofing. All offices and laboratories were ceiled with gypsum board and lined with rock board with the exception of the air-conditioned rooms which were lined with 1" fibroacoustic board and balsum wool blanket type insulation, conference room which was also ceiled with fibroacoustic board, and two special rooms which were

lined complete with fibre board and painted two coats. Floors were concrete throughout with the exception of five offices, which were covered with mastic tile, wooden walkways and accessible portions of the pipe gallery. Doors, frames, sash and louvres were of wood. Also included with this building is one underground pre-stressed Gunitite Tank with circular suspended dome, 20' 0" I.D., 31' O.D., 10' 0" high, maximum 7' 6", construction same as Building 206, capacity 18,000 gallons.

- (9) Dimensions - Overall 393' 4" x 174' 3 1/2".
East & West Wings 174' 2" x 51' 7 1/2" each, 12' 0" eaves, 12' 7" gable, 10' 0" ceilings.
Middle wing 132' 3 1/2" x 51' 7 1/2", cross-section dimensions same as east and west wings, change house addition 112' 0" x 42' 0", 12' 6" eaves, 10' 6" gable, 10' 0" ceilings.
Two Connecting Sections 91' 6 1/2" x 51' 7 1/2" each, cross-section dimensions same as east and west wings.
East Projection - 2 story section 36' 0" x 51' 7 1/2", 27' 0" height of explosion chambers, 23' 0" height of main floor, 31' 10" maximum ceiling, 12' 6" height of main floor.
Lean-To Section 18' 11" x 51' 7 1/2", 13' 0" eaves, 10' 0" minimum ceiling.
- (10) Total Volume - 901,378 cu. ft.
- (11) Sq. Ft. Floor & Type - 38,136 sq. ft. concrete of which 1,878 sq. ft. was covered with 3/8" Mastic tile; 4300 sq. ft. 1" T & G wood catwalk flooring; 810 sq. ft. 2" T & G wood flooring.
- (12) No. Rooms - 78 - 20 Laboratories, 19 Offices, 5 Explosion-Proof Laboratories, Testing Laboratory, 6 unnamed rooms, 2 Work Rooms, Instrument Room, Glass-Blowing Room, Dark Room, Storeroom, Receiving Room, 4 Utility Rooms, Conference Room, Library, Storage Room, Balance Room, 4 Shower Rooms, Clean Clothes Dispensing Room, 2 Men's Toilet Rooms, Women's Toilet Room, 6 Closets. Not included are 6 vestibules and 2 platforms.
- (13) Lumber - 327,920 bd. ft. total - 32,000 bd. ft. strip siding; 195,000 bd. ft. frame; 95,000 bd. ft. sheathing and decking; 5,920 bd. ft. T & G flooring; 35,000 sq. ft. 3/8" gypsum board; 45,500 sq. ft. 1/2" rock board; 7000 sq. ft. 1" fibroacoustic.
- (14) No. Cu. Yds. Concrete - 30 cu. yds. Gunitite, 2369 cu. yds. Class A concrete
- (15) No. Brick - 50,000 2" x 4" x 8" red common
- (16) Sq. Roofing & Type - 30,47 sqs. Built-Up, 461.79 sqs.

Asphalt shingles

(17) **Structural Steel - None**

(18) **Services & Facilities - Propane gas; air; steam; process drain lines; process and sanitary sewers; plumbing and drainage; toilet and washroom facilities; raw water; filtered water; hot water; fire sprinkler system; fume exhaust and ventilating system; air conditioning; lighting 110 V, A. C., 60 C; power 220/440 V, 3 P, 60 C, 70 V, D. C., 450 A, single P, 125 V, D.C., single P; and telephone.**

(19) **Additions & Changes**

First Addition - Change House, facilities and equipment, 115' 0" x 45' 0".

Added - 2 Auxiliary Electric Generator Buildings-- wood frame 12' 3" x 8' 7", 8' 0" eaves, rock board lining, exposed studding, concrete exterior wall foundation, concrete floor, and built-up roof--used to house 2 KW 110 V, A.C., 60 C by gasoline driven motor generator sets; and Storage Tank; Vacuum Pump; Catwalk; Kluge Outlets; Steam Lines; Gas Lines; and Plumbing.

Changed - Conduit, wire, and steam line sizes.

(20) **Major Bldg. Equipment - The start up dates for the major equipment was in respect to the location of the equipment. The east half was started up first, the west half second, and the first addition third, as shown on first page.**

The major pieces of equipment installed were as follows;

2 10 KW M.C. sets, 125 V, D.C.

2 Balancer sets, 125 V, D.C.

2 Kinney Vacuum Pumps

1 Barnstead still and sterilizer

2 stainless steel Bird centrifuges

7 agitators

6 Chemical feed pumps

2 furnaces

2 Green-Kelley hot water heaters and controls

2 Russ vacuum pumps

2 72" vacuum tanks

and laboratory furniture and equipment

shop tools consisting of hack saw, bench

lathe, drill press, pedestal grinder, and

bandsaw.

10 Frigidaire air cooling units

3 Carrier

3 "Freon" compressors

4 Laboratory hood exhaust fans

26 Multi-blade exhaust fans

4 3/4 type HV Clarage fans

1 #1 S/S w Clarage fan

2 Buffalo Forge propeller fans
1 JIS Ventura fan
1 20" in diameter Gunite tank
Special Millivolt test equipment

SUMMARY BUILDING DATA

- (1) Building No. - 706-AA
- (2) Name - OIL STORAGE BUILDING
- (3) Date Construction Started - August 5, 1943.
- (4) Date Start-Up - September 15, 1943.
- (5) Date Acceptance Approved by CLINTON LABORATORIES - October 14, 1943.
- (6) Date Construction Completed - September 15, 1943.
- (7) Date Accepted by Government - October 27, 1943.
- (8) Type of Construction - 1 story wood frame; gable roof with sheet metal ventilators; asphalt shingle roof; 1" T & G sheathing and decking and drop-siding with building paper insulation between decking and drop-siding; exposed studding, reinforced concrete curtain wall foundations and reinforced concrete floor; and wooden doors, frames and sash.
- (9) Dimensions 20' 0" x 20' 0", 11' 0" eaves, 5' 0" gable, 10' 0" minimum ceiling.
- (10) Total Volume 0 10, 410 cu. ft.
- (11) Sq. Ft. Floor and Type - 600 sq. ft. Concrete Slab 4" thick.
- (12) No. Rooms - 1
- (13) No. Board Ft. Lumber - Total 4,550 bd. ft.; 1750 bd. ft. decking and sheathing; 2,000 bd. ft. framing; 1800 bd. ft. drop-siding.
- (14) No. cu. yds. Concrete - 10 cu. yds.
- (15) Sq. Roofing and Type - 7.48 sqs. Asphalt Shingles.
- (16) No. Tons Structural Steel - None.
- (17) Hldg. Services & Facilities - Steam Heat, steam, ventilation, and lighting 110 V A.C., 60 C.
- (18) Additions and Changes - None.
- (19) Major Hldg. Equipment - None.

~~SECRET~~

SUMMARY BUILDING DATA

- (1) Building No. - 706-AB
- (2) Name - ~~SECRET~~ BUILDING
- (3) Date Construction Started - September 8, 1943.
- (4) Date Start-Up - October 29, 1943.
- (5) Date Acceptance Approved by CLINTON LABORATORIES - October 27, 1943.
- (6) Date Construction Completed - September 25, 1943.
- (7) Date Accepted by Government - November 7, 1943.
- (8) Type of Construction - 1 story wood frame; concrete curtain wall foundations and concrete floor; shed roof with built-up roofing; 1" T & G sheathing and decking and drop siding with building paper insulation between siding and decking; and wooden frame and door.
- (9) Dimensions - 8' 9" x 10' 9" x 10' 0" high; 8' 0" minimum ceiling.
- (10) Total Volume - 1025 cu. ft.
- (11) Sq. Ft. Floor and Type - 94.0 Ft. - Concrete Slab 4" thick.
- (12) No. Rooms - 1
- (13) No. Board Ft. Lumber - Total 1400 bd. ft.; 500 bd. ft. Sheeting and decking; 400 bd. ft. drop siding; 500 bd. ft. frame.
- (14) ~~SECRET~~ Concrete - 10
- (15) ~~SECRET~~ Type - 1.0 sqs. Built-Up.
- (16) ~~SECRET~~ Structural Steel - None.
- (17) Building Services and Facilities - Oxygen, lighting 110 V, A.C., 60 C.
- (18) Additions and Changes - None.
- (19) Major Building Equipment - None.

SUBJURY BUILDING DATA

- (1) Building No. - 706-B
- (2) Name - LABORATORY
- (3) Date Construction Started - June 14, 1943.
- (4) Date Start Up - North End--September 20, 1943.
South End--November 7, 1943.
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
December 23, 1943.
- (6) Date Construction Completed - October 23, 1943.
- (7) Date Accepted by Government - December 23, 1943.
- (8) Type of Construction - 1 story rectangular wood frame and concrete structure of which the concrete portion consists of an explosion-proof laboratory with concrete walls and roof slab 8'-0" thick and the inside walls are covered with fibrous acoustic board; concrete curtain wall; reinforced concrete wall, and pier foundations with spread footings; concrete floor; gable roof covered with asphalt shingles; 1" W & G decking, sheeting and drop siding with building paper insulation between siding and decking; gypsum board ceiling; rock board partition and lining; balsam wool blanket type insulation for lab laboratory only; and wooden doors, frames, and sash.
- (9) Dimensions - 134'-0" x 42' 0", 11' 4" eaves, 10' 6" gable, 10' 0" min/um ceiling.
- (10) Total Volume - 101,500 cu. ft.
- (11) Sq. Ft. Floor & Type - 3,255 cu. ft. concrete.
- (12) No. Rooms - 16; 10 laboratories, Explosion-Proof Laboratory, Dark Room, Men's and Women's Toilet Rooms, Storeroom, Janitor's Closet; not included are loading platform and vestibule.
- (13) No. Board Ft. Lumber - Total 47,600 bd. ft.; 18,600 bd. ft. sheeting and decking; 4,000 bd. ft. drop siding; 5,500 sq. ft. 3/8" gypsum board; 28,000 bd. ft. frame 6,000 sq. ft. 1/4" rock board; 900 sq. ft. 1" fibrous acoustic board.
- (14) No. Cu. Yds. Concrete - 567 cu. yds.
- (15) Sq. Roofing & Type - 65.14 sqs. Asphalt Shingles, 1 sq. Built-up.
- (16) No. Tons Structural Steel - None.

(17) Bldg. Services & Facilities - Steam; steam heat; propane gas; air ventilating system; fume exhaust system; air conditioning; raw water; filtered water; hot water; fire protection system; sanitary and process sewers; plumbing and drainage; toilet and washroom facilities; lighting 110 V, A.C., 60 C; power 220 V and 440 V, 3 P, 60 C, 250 V, D.C.; and telephones.

(18) Additions & Changes - Added: Auxiliary Electric Generator Building - wood frame 12' 7" x 8' 7", 8' 0" eaves, 1" rock board lining, exposed studding, concrete curtain wall foundation, concrete floor, built-up shed roof - used to house one stand-by gasoline driven motor generator set, 60 C, 8 KW, 110 V, A.C.

(19) Major Bldg. Equipment - The start up date of the major equipment depended upon its location as North Side was started up first and South Side was started up last, as shown on first page.

The major building equipment installed was as follows:

1 11KW M.C. set, 125 V, D.C.

1 Balancer set.

1 Patterson-Kelley hot water heater, 20" x 60", and controls.

Meters and instruments, and miscellaneous laboratory equipment.

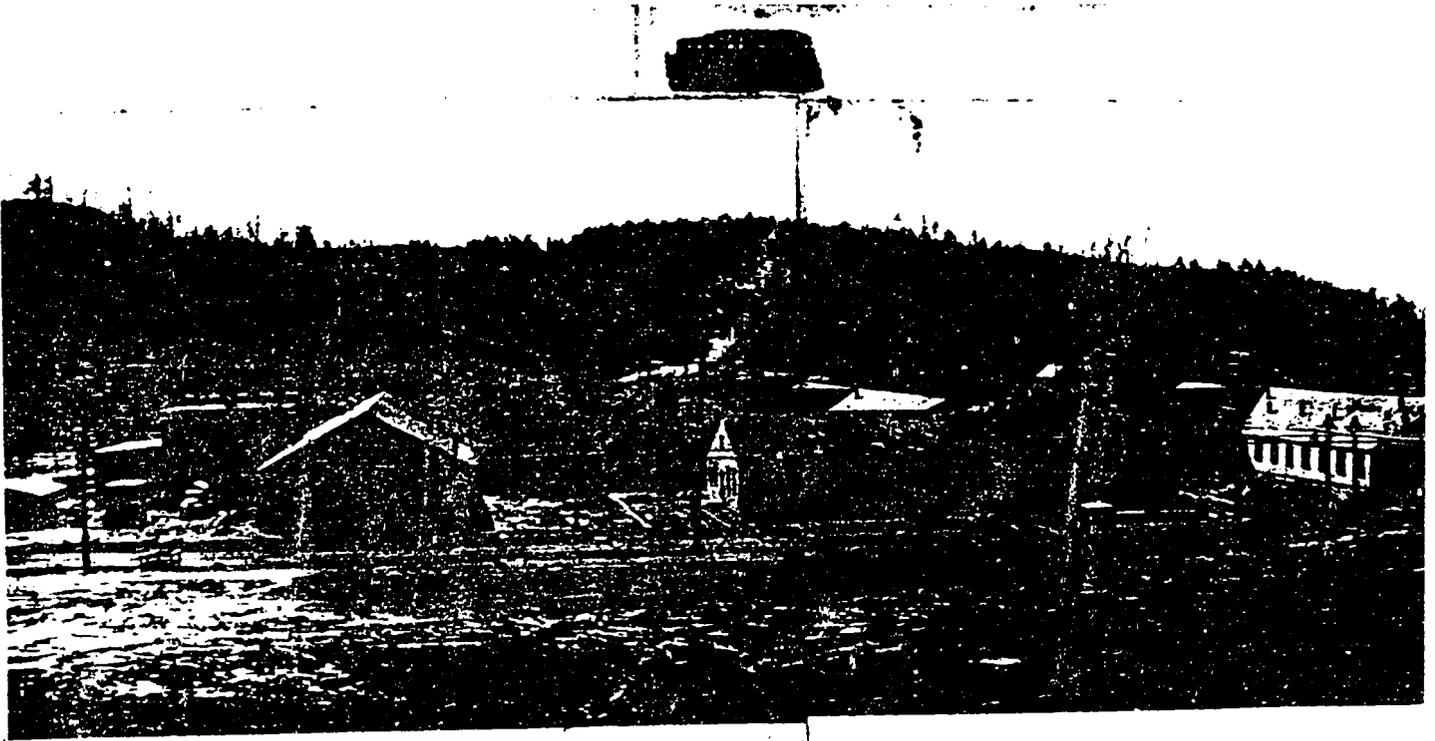
Office and laboratory furniture.

1 3/4 HV Clarge fan.

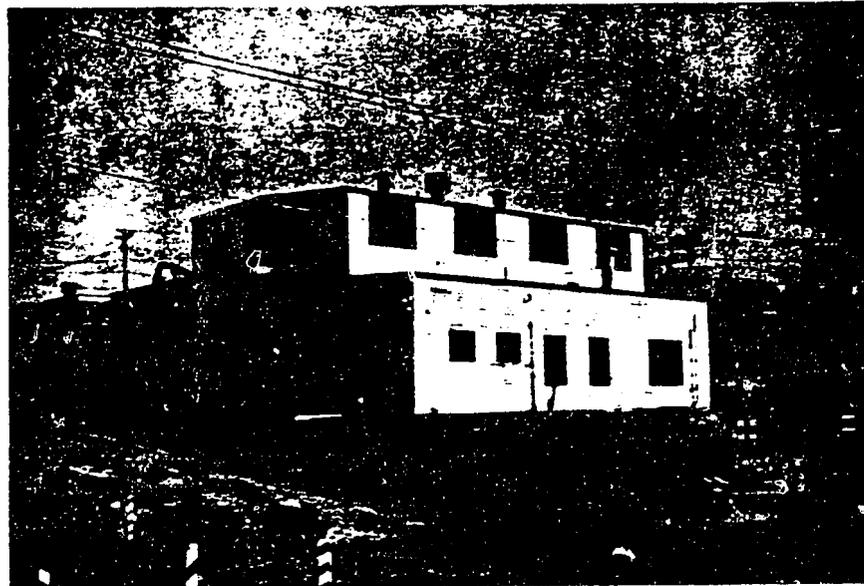
1 Carrier "Freon" Compressor.

3 Frigidaire air units.

Special Millivolt test equipment.



Laboratory - Bldg. 706-A
Looking Southwest
Project 9733
Clinton Engineer Works
Roll 811-2, 811-3 Date 3-13-44



Laboratory - Bldg. 706-C
Looking Northeast
Project 9733
Clinton Engineer Works
Roll 811-4 Date 3-13-44

SUMMARY BUILDING DATA

- (1) Building No. - 706-G
- (2) Name - HOT LABORATORY
- (3) Date Construction Started - December 14, 1943
- (4) Date Start Up - No Start-Up as of April 1, 1944
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
March 15, 1944
- (6) Date Construction Completed - March 4, 1944
- (7) Date Accepted by Government - March 20, 1944
- (8) Type of Construction - 3 & 2 story concrete and wood frame structure of which the main structure or workroom is comprised of a 3 story section with wood truss-supported shed roof sloped two ways and houses two reinforced concrete hot laboratory test banks with reinforced concrete walls 8' 6" thick. The main structure has a 2 story wood frame lean-to attached to the north side which houses an explosion-proof reinforced counting room, four reinforced concrete cell laboratories and main chemical laboratory; and has a 2 story lean-to attached to the south side which houses office, workroom, machinery room, and toilet and locker rooms. A concrete loading platform is attached to the west side. Foundations are composed of reinforced concrete slabs, reinforced concrete walls and piers with spread footings, and reinforced curtain walls. Ground floor is reinforced concrete throughout; second and third floors, walkways, and steps are composed of wood. Building is covered with 1" T & G sheeting, decking, and drop siding with building paper insulation between siding and decking. Roofs are covered with Built-Up roofing and have A.C.M. roof ventilators. Building has rock board ceilings throughout with the exception of counting room and main workroom; side walls and ceiling of counting room are lined with 1" fibroacoustic board; walls and ceilings of cells 1, 2, and 3 are insulated with 2" balsam wool. Building has wooden doors, frames, sash, and louvres.
- (9) Dimensions - Overall 67' 0" x 63' 0".
Main Structure 53' 5" x 63' 0", 27' 9" eaves, high
Point of roofing 28' 6", minimum ceiling 22' 0".
North Lean-To 21' 11" x 63' 0", 19' 0" eaves, minimum
ceiling 10' 0" first floor and 8' 6" second floor.
South Lean-To 11' 8" x 63' 0", 16' 8" eaves, 10' 0"
minimum ceiling first floor and 4' 9" second
floor.
Loading Platform 10' 0" x 18' 0", 4' 0" high.
- (10) Total Volume - 104,600 cu. ft.

- (11) Sq. Ft. Floor & Type - 1990 sq. ft. 1" & 2" T & G wood flooring
- (12) No. Rooms - 17 - Main Workroom, 2 Hot Laboratory Testing Banks, 4 cells, Counting Room, Chemical Laboratory, Shop Workroom, Office, Machinery Room, 2 Van Rooms, Men's and Women's Toilet and Locket Rooms.
- (13) No. Board Ft. Lumber - Total 55,000 bd. ft. - 30,000 bd. ft. frame; 13,500 bd. ft. sheeting and decking; 7,500 bd. ft. drop siding; 4,000 bd. ft. T & G flooring; 550 sq. ft. $\frac{1}{2}$ " rock board; 750 sq. ft. 1" fibroacoustic.
- (14) No. Cu. Yds. Concrete - 653 cu. yds.
- (15) Sq. Roofing & Type - 47.0 sqs. Built-Up
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Steam; steam heat; distilled water; filtered water; raw water; hot water; propane gas; air; process and sanitary sewers; process drain lines; plumbing and drainage; ventilation; air conditioning; toilet, shower and washroom facilities; fume exhaust system; lighting 110 V, A.C., 60 C; power 220/440 V, 3 P, 60 C and 125 V, D.C., 10 KW; and telephones.
- (18) Additions & Changes - AUXILIARY ELECTRIC GENERATOR BUILDING -- Wood frame 12' 7" x 8' 7", 8' 0" eaves, rock board lining, exposed studding, concrete curtain wall foundation, concrete floor, and shed roof-- used to house one 110 V, A.C., 60 C stand-by gasoline driven motor generator set, 5 KW.
- (19) Major Bldg. Equipment
 Start up date Counting Room - No Start-Up as of April 1, 1944
 Start up date Chemical Laboratories - No Start-Up as of April 1, 1944
 Start up date Cells - No Start-Up as of April 1, 1944
 Start up date 1 & 2 Test Banks - No Start-Up date as of April 1, 1944.
 Start up date Work Shop - No Start-Up as of April 1, 1944

The following list of major equipment was installed:
 2 Reinforced concrete hot laboratory test chambers
 1 Motor generator set 10 KW, 125 V, D.C.
 1 Motor controller and generator panel
 3 Frigidaire air cooling units
 1 "Freon" compressor
 6 $\frac{3}{4}$ " Clarge fans
 1 #1 3/8 MS Ready unit SW-31 Clarge fan with $\frac{3}{4}$ H.P. motor

2 #27 type Buffalo Forge C.I. housed exhausters
impeller cooled with "Heresite"
1 #18-L Buffalo drill press with $\frac{1}{2}$ H.P. motor
1 10" bench lathe and attachments
1 Model V-16 Doall metal cutting band saw
1 Pedestal grinder, Baldor #724
1 #MF-O Atlas milling machine
1 24" x 84" Richmond hot water heater and con-
trols
1 Vacuum tank
2 Vacuum pumps and electric motors
1 Steam water still (Barnstead)
Laboratory and office furniture, hoods, labo-
ratory equipment, instruments, etc.

SUMMARY BUILDING DATA

- (1) Building No. - 707-A
- (2) Name - CHANGE HOUSE (White Men's)
- (3) Date Construction Started - February 24, 1943
- (4) Date Start Up - September 6, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - October 11, 1943
- (6) Date Construction Completed - September 1, 1943
- (7) Date Accepted by Government - October 12, 1943
- (8) Type of Construction - 1 story wood frame cross-shaped structure with toilet and guard room projections on the north, east, and west sides and lean-to hot water heater room on the south side; concrete curtain wall foundation and concrete floor; flat and shed roofs with wooden ventilator; 1" T & G sheathing, decking and drop siding with building paper insulation between siding and decking; studded rock board partitions; toilet and shower room walls lined with rock board; and wooden doors, frames, and sash.
- (9) Dimensions - Overall 50' 8" x 60' 2",
Main Structure 38' 8" x 39' 0", 12' 8" eaves, 11' 0" minimum ceiling,
Guard Room 6' 0" x 12' 0", 12' 8" eaves, 11' 0" minimum ceiling,
Heater Room 9' 8" x 17' 6", 7' 6" eaves, 7' 0" minimum ceiling.
- (10) Total Volume - 31,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 2,351 sq. ft. concrete slab 4" thick.
- (12) No. Rooms - 2 - 2 Locker Rooms, 2 Guard Rooms, Washroom, Shower Room, Toilet Room, and Heater Room.
- (13) No. Board Ft. Lumber - 15,350 bd. ft. total - 5000 bd. ft. sheathing; 5,500 bd. ft. decking; 2,750 bd. ft. drop siding; 2,600 sq. ft. 1/2" rock board.
- (14) No. Cu. Yds. Concrete - 25 cu. yds.
- (15) Sq. Roofing & Type - 22.5 sqs. Build-Up Roofing.
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Steam; steam heat; ventilation; filtered water; hot water; sanitary sewers; plumbing

and drainage; toilet and washroom facilities; lighting
110 V, A. C., 60 C.

- (18) Additions & Changes - None
- (19) Major Bldg. Equipment - None with the exception of a Pat-
erson-Kelly hot water heater, 42" x 120" and controls,
18" Buffalo Forge wall exhaust fan, and 150 wood lockers.

SUMMARY BUILDING DATA

- (1) Building No. - 707-B
- (2) Name - ORANGE HOUSE (Colored Men's)
- (3) Date Construction Started - February 26, 1943
- (4) Date Start Up - September 6, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - November 12, 1943
- (6) Date Construction Completed - August 14, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction - 1 story wood frame structure with concrete curtain wall foundations and concrete floor; shed roof with wooden ventilator; 1" T & G decking, sheeting and drop siding with building paper insulation between siding and decking; side walls of toilet room, vestibule, and locker room lined with rock board; and wooden doors, frames, and sash.
- (9) Dimensions - 23' 4" x 15' 8", 12' 2" & 12' 10" eaves, 10' 8" minimum ceiling.
- (10) Total Volume - 6210 cu. ft.
- (11) Sq. Ft. Floor & Type - 370 sq. ft. concrete 4" thick.
- (12) No. Rooms - 5 - Locker Room, Shower Room, Toilet Room, Heater Room, and Vestibule.
- (13) No. Board Ft. Lumber - 4800 bd. ft. total - 1200 bd. ft. drop siding, 2000 bd. ft. frame, 1800 bd. ft. sheeting & decking and 2500 sq. ft. 3/4" rock board.
- (14) No. Cu. Yds. Concrete - 25 cu. yds.
- (15) Sq. Roofing & Type - 4.5 sqs. Built-Up Roofing.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; filtered water; hot water; plumbing and drainage; sanitary sewers; toilet and washroom facilities; lighting 110 V. A.C., 60 C.
- (18) Additions & Changes - See Building 707-BB
- (19) Major Bldg. Equipment - None with the exception of a Patterson-Kelley Hot Water Heater, 24" x 72", and Controls, and 22 wood Lockers.

SUMMARY BUILDING DATA

- (1) Building No. - 707-BB
- (2) Name - CHANGE HOUSE (Colored Women)
- (3) Date Construction Started - December 15, 1943
- (4) Date Start Up - January 27, 1944
- (5) Date Acceptance Approved by CLINTON LABORATORIES - February 14, 1944
- (6) Date Construction Completed - January 21, 1944
- (7) Date Accepted by Government - February 15, 1944
- (8) Type of Construction - 1 story wood frame structure composed of three sides of Building 707-B having concrete curtain wall foundation; reinforced concrete floor; flat shed built-up roof with roof ventilator; 1" T & G sheeting, decking and drop siding with building paper insulation between, lined with rock board, exposed rafters unceiled; wooden doors, frames and sash.
- (9) Dimensions - 15' 8" x 28' 4", 11' 6" eaves, 10' 0" minimum ceiling.
- (10) Total Volume - 5000 cu. ft.
- (11) Sq. Ft. Floor & Type - 415 sq. ft. concrete
- (12) No. Rooms - 6 - 2 Shower Rooms, Locker Room, Rest Room, Toilet Room, and Vestibule.
- (13) No. Board Ft. Lumber - Total 3,900 bd. ft. - 1500 bd. ft. frame, 900 bd. ft. drop siding, 1500 bd. ft. decking & sheeting, 2200 sq. ft. 1/2" rock board.
- (14) No. Cu. Yds. Concrete - 18 cu. yds.
- (15) Sq. Roofing & Type - 4.64 sqs. Built-Up
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Steam; steam heat; hot water; filtered water; plumbing and drainage; sanitary sewers; toilet and washroom facilities; lighting 110 V, A.C., 60 C.
- (18) Additions & Changes - None
- (19) Major Bldg. Equipment - None with the exception of 24 wood lockers, and benches.

SUMMARY BUILDING DATA

- (1) Building No. - 707-C
- (2) Name - CHANGE HOUSE (Men's & Women's)
- (3) Date Construction Started - December 13, 1943
- (4) Date Start Up - February 10, 1944
- (5) Date Acceptance Approved by CLINTON LABORATORIES - March 7, 1944
- (6) Date Construction Completed - February 9, 1944
- (7) Date Accepted by Government - March 9, 1944
- (8) Type of Construction - 1 story wood frame structure with concrete curtain wall foundation; reinforced concrete floor; flat shed roof sloped one way with wood roof ventilators; 1" T & G sheathing, decking and drop siding with building paper insulation between siding and decking; walls and partitions lined with rock board; exposed rafters; and wooden doors, frames, sash, and louvres.
- (9) Dimensions - 28' 4" x 31' 4", 12' 4" & 13' 0" eaves, 10' 0" minimum ceiling.
- (10) Total Volume - 11,500 cu. ft.
- (11) Sq. Ft. Floor & Type - 745 sq. ft., concrete; 65 sq. ft., cinder.
- (12) No. Rooms - 11 - 2 Locker Rooms, 2 Toilet Rooms, 3 Shower Rooms, Rest Room, Heater Room, 2 Vestibules.
- (13) No. Board ^{ft.} Lumber - Total 9,000 bd. ft. - 3,500 bd. ft. frames; 3,500 bd. ft. sheathing; 2000 bd. ft. drop siding; 3,500 sq. ft. $\frac{1}{2}$ " rock board.
- (14) No. Cu. Yds. Concrete - 50 cu. yds.
- (15) Sq. Roofing & Type - 9.28 sqs. Built-Up Roofing.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; filtered water; hot water; plumbing and drainage; sanitary sewers; toilet and washroom facilities; lighting 110 V, A.C., 60 C.
- (18) Additions & Changes - None.

[REDACTED]

(19) Major Bldg. Equipment - None with the exception of
1 30" x 96" hot water heater and controls,
58 lockers, and benches.

SUMMARY BUILDING DATA

- (1) Building No. - 708
- (2) Name - CAFETERIA
- (3) Date Construction Started Original Bldg. - March 10, 1943
Date Construction Started First Increase - December 27, 1943
- (4) Date Start Up Original Bldg. July 24, 1943
Date Start Up First Increase - March 10, 1944
- (5) Date Acceptance Original Building Approved by CLINTON LABORATORIES - December 7, 1943
Date Acceptance First Increase Approved by CLINTON LABORATORIES - March 20, 1944
- (6) Date Construction Original Building Completed - December 6, 1943
Date Construction First Increase Completed - March 11, 1944
- (7) Date Original Bldg. Accepted by Government - December 9, 1943.
Date First Increase Accepted by Government - March 21, 1944
- (8) Type of Construction - 1 story wood frame combined gable and shed truss structure with wood frame lean-to along the entire north side, wood frame hipped lean-to along the greater portion of the south side, and wood frame lean-to vestibule on the east side. Foundations are composed of concrete walls with spread footings, reinforced concrete piers with spread footings, and concrete curtain walls. Floors are concrete throughout with concrete platform steps at the south and west entrances and concrete slab platforms at the other entrances. The gable and lean-to roofs are covered with asphalt shingles and the shed portion of the first addition is covered with built-up roofing and has A.C.M. roof ventilators. Siding is composed of 1" T & G decking and drop siding with 1" building paper insulation between. Walls are lined with rock board and gypsum board ceiling is used in all rooms except serving room and porch, which have exposed rafters. This building has wooden doors, sash, frames and louvres.
- (9) Dimensions - Overall 74' 0" x 88' 3".
Original Bldg. 70' 0" x 41' 6", 13' 2" eaves, 10' 6" minimum ceiling, 10' 6" gable.
South side lean-to 33' 0" x 10' 0", 10' 8" eaves, 9' 0" ceiling.
East side lean-to 50' 1 1/2" x 8' 3 3/4", 8' 0" eaves, 7' 2 3/4" minimum ceiling.

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North side lean-to 49' 9 3/4" x 8' 3", 8' 0" eaves, 7' 2 3/4" minimum ceiling.
West side lean-to vestibule 5' 9 1/2" x 4' 11", 10' 6" eaves, 8' 0" minimum ceiling.
First Increase - Main structure 32' 6" x 70' 0", 17' 10" eaves, 11' 6" & 9' 10" ceilings.
South side lean-to 29' 0" x 10' 0", 10' 8" eaves, 9' 0" ceiling.
North side lean-to 32' 6" x 8' 3", 8' 0" eaves, 7' 2 3/4" minimum ceiling.

- (10) Total Volume - 117,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 6460 sq. ft. concrete slab.
- (12) No. Rooms - 19 - White and Colored Dining Rooms, Canteen, Check Room, Porch, Kitchen, Preparation Room, 2 Storage Rooms, 2 Cold Storage Rooms, Dishwashing Room, 4 Locker & Toilet Rooms, and 3 Vestibules.
- (13) No. Board Ft. Lumber - Total 59,000 bd. ft. - 7,000 bd. ft. drop siding; 17,000 bd. ft. sheathing and decking; 35,000 bd. ft. frame; 2500 sq. ft. 3/8" gypsum board; 12,500 sq. ft. 1/2" rock board.
- (14) No. Cu. Yds. Concrete - 253 cu. yds.
- (15) Sq. Roofing & Type - 55 sqs. Asphalt Shingles, 31.5 sqs. Built-Up Roofing.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; filtered water; hot water; plumbing and drainage; sanitary sewers; toilet and washroom facilities; ventilation; refrigeration; fume exhaust system; lighting 110 V, A. C., 60 C; power 220/440 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Added: 8' 3" lean-to section to north end of original building and necessary facilities and equipment for three additional shower and locker rooms, a janitor's closet, and addition to present storage room. First Increase--increased size of building facilities and equipment to provide 100% larger seating and serving capacity; also provided colored dining room, canteen, and additional storage space.
- (19) Major Bldg. Equipment - Start up date for equipment is same as shown in part (4).
The following list of Cafeteria equipment was installed:
1-36" x 84" Patterson-Kelley hot water heater and controls

2 Kitchen King electric ranges
2 Counters
3 Battery coffee urns
2 Steam tables
2 Ice cream cabinets
4 Bottle coolers
2 Dish washers, Blakeslee Model D, steamers
and dryers
2-16 cu. ft. electric refrigerators
1 Electric steam table and hot plate
1-40 Gal. steam kettle
1 Peeler, Blakeslee Model '30
2-3/4 H.P. M & E air-cooled condensing units
for meat storagelockers.
1 Fish box
1 Electric baking oven
2 Multi-blade Clarage fans, type 28 M.S., com-
plete with 1/3 H.P. single phase, 50 C,
110 V motors.
Tables, chairs, dishes, cooking utensils, etc.

SUMMARY BUILDING DATA

- (1) Building No. - 713-A
- (2) Name - MATERIAL STORAGE BUILDING
- (3) Date Construction Started - August 23, 1943
- (4) Date Start Up - October 15, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 7, 1943
- (6) Date Construction Completed - October 1, 1943
- (7) Date Accepted by Government - December 9, 1943
- (8) Type of Construction - 1 story flat and shed roof wood frame structure having an attached wood frame lean-to section across the entire east end, with concrete curtain wall; concrete piers and walls with spread footings; reinforced concrete floors; combined flat and shed roof sloped two ways, covered with Built-Up roofing and having sheet metal ventilators; 1" T & G sheathing and drop siding with building paper insulation between; offices and toilet rooms lined with rock board having exposed ceilings; receiving, clothing and stock rooms separated by studded partitions covered with 1" T & G slatting and chicken wire; and wooden doors, frames, sash and louvres.
- (9) Dimensions - 130' 6" x 41' 6", 13' 6" & 16' 6" eaves, 12' 4" minimum ceiling, 13' 0" maximum ceiling.
- (10) Total Volume - 33,300 cu. ft.
- (11) Sq. Ft. Floor & Type - 31,000 sq. ft. 4" concrete
- (12) No. Brick - 21,000 2" x 4" red common
- (13) No. Rooms - 9 - 2 Offices, Receiving Room, Stock Room, Clothing Room, Hydrogen and Oxygen Storage Room, Paint and Oil Storage Room, Men's and Women's Toilet Rooms
- (14) No. Board Ft. Lumber - Total 33,500 bd. ft. - 12,000 bd. ft. frame; 10,500 bd. ft. sheathing and decking; 5000 bd. ft. drop siding; 2200 sq. ft. 1" rock board.
- (15) No. Cu Yds. Concrete - 125 cu. yds.
- (16) Sq. Roofing & Type - 55 sqs. Built-Up
- (17) No. Tons Structural Steel - None
- (18) Bldg. Services - steam heat; filtered water; fire protection system; raw water; hot water; plumbing and drainage;

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sanitary sewers; toilet and washroom facilities; lighting 110 V, A. C., 60 C; and telephones.

- (19) Additions & Changes - Offices, partitions, washrooms and toilet facilities added in the west end of the existing structure.
- (20) Major Bldg. Equipment - None

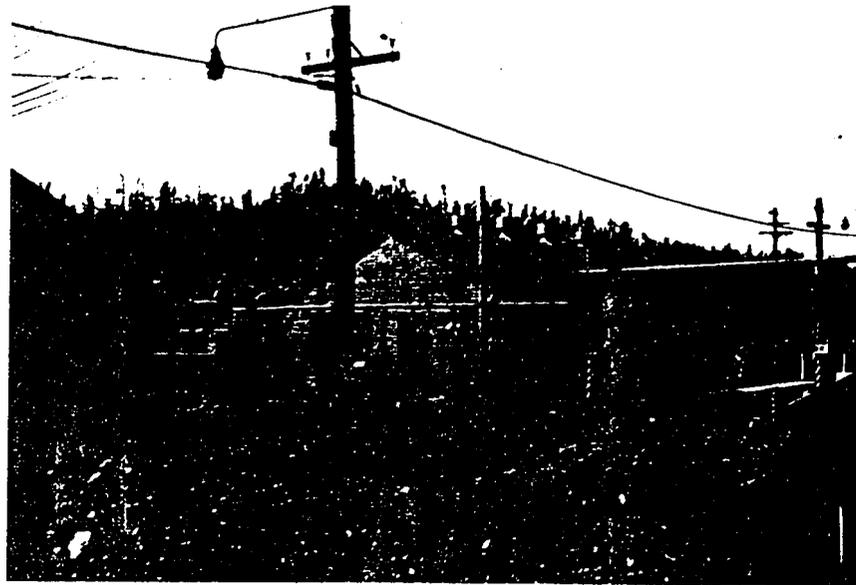
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SUMMARY BUILDING DATA

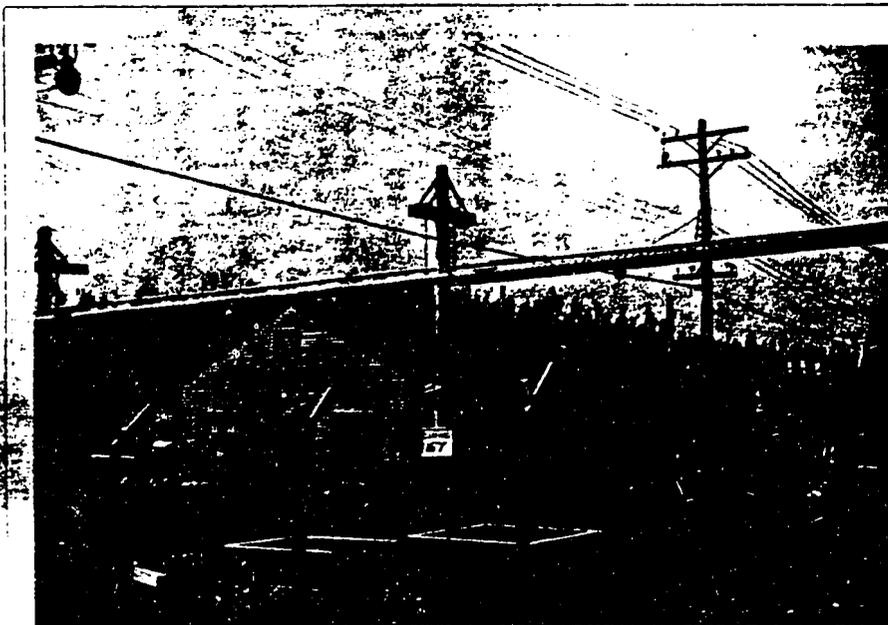
- (1) Building No. - 714
- (2) Name - STORAGE PLATFORM
- (3) Date Construction Started - September 21, 1943
- (4) Date Start Up - October 29, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - November 12, 1943
- (6) Date Construction Completed - October 8, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction - Reinforced concrete elevated storage platform surrounded on three sides by concrete gutter, reinforced concrete curtain walls, and reinforced concrete floor.
- (9) Dimensions - 200' 0" x 50' 0", 4' 0" high on loading side, 1' 0" above gutter on north side
- (10) Total Volume - 40,800 cu. ft.
- (11) Sq. Ft. Floor & Type - 10,000 sq. ft. concrete 4" thick
- (12) No. Rooms - None
- (13) No. Board Ft. Lumber - None
- (14) No. Cu. Yds. Concrete - 245 cu. yds.
- (15) Sq. Roofing - None
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Concrete gutter drainage
- (18) Additions & Changes - Changed design of west curtain wall to reinforced concrete wall supported by beam and reinforced pier with spread footing foundation
- (19) Major Bldg. Equipment - None

SUMMARY BUILDING DATA

- (1) Building No. - 715
- (2) Name - FLAG POLE
- (3) Date Construction Started - May 1, 1943
- (4) Date Start Up - May 3, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
November 12, 1943
- (6) Date Construction Completed - May 3, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction - Skinned wood pole 35' 0" high, dia-
meter at the butt 14", erected with 10' 0" in the
ground encased in concrete.
- (9) No. Cu. Yds. Concrete - 1 cu. yd.



Shop & Supply Storage House - Bldg. 717-A
Looking Southwest
Project 9733
Clinton Engineer Works
Roll 211-6 Date 3-13-44



Special Machine Shop - Bldg. 717-B
Looking Southwest
Project 9733
Clinton Engineer Works
Roll 211-1 Date 3-13-44

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SUMMARY BUILDING DATA

- (1) Building No. - 717-A
 - (2) Name - SHOP & SUPPLY STORAGE HOUSE
 - (3) Date Construction Started - February 27, 1943
 - (4) Date Start Up - July 25, 1943
 - (5) Date Acceptance Approved by CLINTON LABORATORIES - December 13, 1943
 - (6) Date Construction Completed - December 8, 1943
 - (7) Date Accepted by Government - December 16, 1943
 - (8) Type of Construction - 1 story wood frame gabled truss structure with concrete curtain wall, concrete wall and spread footings, and reinforced concrete pier with spread footing foundations; reinforced concrete floor; 1" T & G sheathing, decking, and drop siding with building paper insulation between; gabled roof covered with asphalt shingles and having sheet metal ventilators; wooden studded partitions, one side covered with rock board; scale shop, offices, tool room, welding booths, and toilet room with gypsum board ceiling; wooden doors, frames, and sash; and concrete unloading platform located on the south side of the building at the extreme east end of which is located a wood frame lean-to oxygen, hydrogen and acetylene shelter.
 - (9) Dimensions - Building 90' 0" x 41' 6", 15' 6" eaves, 10' 6" gable, 14' 0" minimum ceiling.
Concrete Platform 10' 6" x 60' 0", 4" above grade.
Shelter 3' 0" x 8' 0" high.
 - (10) Total Volume - 81,200 cu. ft.
 - (11) Sq. Ft. Floor & Type - 4,100 sq. ft. concrete 4" thick.
 - (12) No. Rooms - 9 - 2 Fabricating Rooms, 2 Offices, Scale Shop, 2 Welding Booths, Tool Room, Men's Toilet Room.
 - (13) No. Bd. Ft. Lumber - Total 22,400 bd. ft. - 2,700 bd. ft. sheathing; 3,700 bd. ft. drop siding; 20,000 bd. ft. framing; 3000 sq. ft. 1/2" rock board; 1000 sq. ft. 2/3" gypsum board.
 - (14) No. Cu. Yds. Concrete - 138 cu. yds.
 - (15) Sq. Roofing & Type - 47 sqs. asphalt shingles.
 - (16) No. Tons Structural Steel - None.
- [REDACTED]

(17) Bldg. Services & Facilities - Steam; steam heat; air; filtered water; raw water; sanitary sewers; toilet and washroom facilities; plumbing and drainage; ventilation; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C; and telephone.

(18) Additions & Changes - Added: fire line; plumbing and drainage; tool room, welding booths and offices; shelter for oxygen and hydrogen tanks; concrete platform; 4-24" sheet metal ventilators; radiation; exhaust fan for forge.

Changes roofing to asphalt shingles; relocated doors, windows and equipment; omitted carpenter shop; changed service piping locations.

(19) Major Bldg. Equipment - Start up date of individual equipment varied from July 25, 1943, to December 1, 1943, depending upon release of construction equipment. A greater portion of the following list of tools was furnished by the construction force when they were no longer needed for the construction use, thus eliminating double purchase of critical machinery and tools;

1-16" Cincinnati heavy duty shaper with 5 H.P. 440 V, 3 P, 60 C motor.

1-21" Condey-Otto round column drill press.

1-30" dia. x 4" iron frame grindstone with ½ H.P. motor.

1-16" Lathe with 7½ H.P. motor.

1 Double wheel Queen City pedestal grinder.

1 Forge and exhaust fan.

1-16" woodworking jointer.

1-16" woodworking rip saw.

1-4" Teledyne pipe and belt machine.

1 Richmond water heater and controls.

Miscellaneous electrical testing instruments, office furniture, small tools, sawcrail, and 2-ton hoist, work benches, welding equipment, etc.

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SUMMARY BUILDING DATA

- (1) Building No. - 717-B
- (2) Name - SHOP & SUPPLY STORAGE HOUSE
- (3) Date Construction Started - April 8, 1943
- (4) Date Start Up - August 1, 1943
- (5) Date Acceptance Original Bldg. Approved by CLINTON LABORATORIES - February 22, 1944
Date Acceptance First Increase Approved by CLINTON LABORATORIES - March 11, 1944
- (6) Date Construction Original Bldg. Completed - January 12, 1944
Date Construction First Increase Completed - February 10, 1944
- (7) Date Original Bldg. Accepted by Government - March 8, 1944
Date First Increase Accepted by Government - March 20, 1944
- (8) Type of Construction - 1 story wood frame gabled truss structure with concrete wall and reinforced concrete pier with spread footing foundations; reinforced concrete floor; 1" T & G sheeting, decking and drop siding with building paper insulation between decking and siding; gabled roof covered with asphalt shingles having sheet metal ventilators; wood studded partitions, two sides covered with rock board with all rooms ceiled with gypsum board, with the exception of machine shop; 1" balsum wool insulation ceiling and walls of detection device room; wooden doors, frames and sash.
- (9) Dimensions - Original Building 90' 0" x 41' 6", 15' 6" eaves, 10' 6" gable, 9' 6" minimum ceiling and 14' 6" maximum head clearance machine shop.
First increase 45' 0" x 41' 6", 15' 6" eaves, 10' 6" gable, 12' 0" ceilings.
- (10) Total Volume - 120,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 5,290 cu. ft. concrete
- (12) No. Rooms - 15 - Machine Shop, Storeroom, 4 Instrument Repair Rooms, Conference Room, Office, 2 Locker Rooms, Men's Toilet Room, Women's Toilet Room, Women's Lounge, Men's Shower Room, Janitor's Closet.

- (13) No. Board Ft. Lumber - Total 47,500 bd. ft. - 14,000 bd. ft. sheathing and decking; 5,500 bd. ft. drop siding; 28,000 bd. ft. frame; 9,200 sq. ft. rock board; 4,500 sq. ft. gypsum board.
- (14) No. Cu. Yds. Concrete - 170 cu. yds.
- (15) Sq. Roofing & Type - 71 sqs. Asphalt Shingles, 1 sq. Built-Up.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; air; propane gas; hot water; plumbing and drainage; filtered water; raw water; toilet and washroom facilities; sanitary sewers and process sewers; air conditioning; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Added: First addition--45' section which includes conference room, office, and two additional instruments repair rooms and necessary facilities for same.
Added: Auxiliary Electric Generator Building --wood frame 12' 7" x 8' 7", 8' 0" eaves, rock board lining, exposed studding, concrete curtain wall foundation, concrete floor and shed roof w/Built-Up roofing -- used to house stand-by gasoline driven motor generator set 3KW 110 V, A.C., 60 C.
Added: Ceiling for storage room, lockers, women's toilet room, men's toilet room, doors and windows, bottle gas and storage compartments, insulation and storm sash, fire hose and piping.
Changes: Changed height of partitions, change room converted into women's toilet and locker room, changed equipment locations, changed doors and windows, changed plumbing and service piping.
- (19) Major Bldg. Equipment - Start up date for the following list of major equipment same as part (4). A portion of this equipment was obtained from construction.

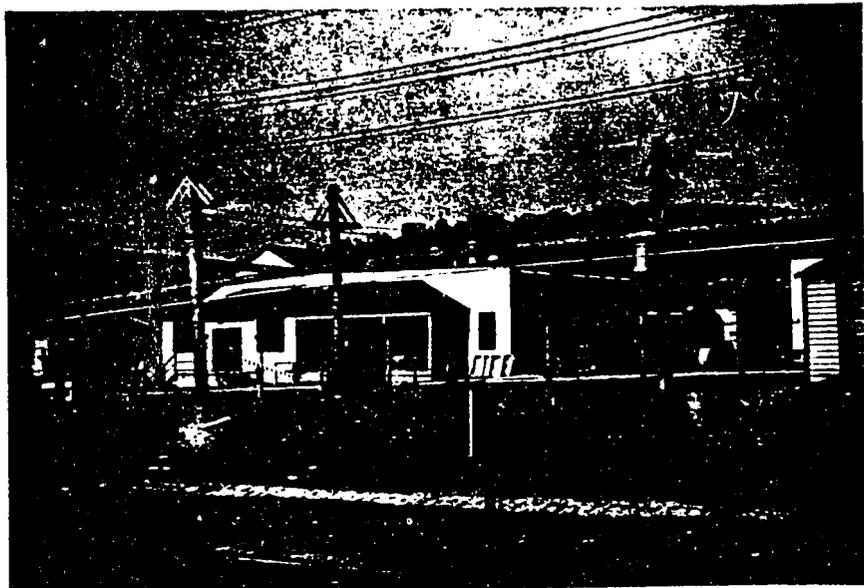
1-7" Shaper and attachments
1 Bench miller
1-14" Floor type drill press
1 Dual wheel pedestal grinder
1 Scroll Saw
2-10" Lathes, 4' bed
1 Power hack saw
1 Metal band saw
1 Arbor press
1 Screw cutting lathe
1-14" x 6 1/2" engine lathe
1 Milling Machine
2 Bench type drill presses
1 Horizontal surface grinder

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1-200 Amp. electric driven welder
1-300 Amp. electric driven welder
1-300 Amp. gasoline driven welder
1 Sheet metal bar folder
1 Sheet metal squaring shear
1 Sheet metal slip former
1-50" x 60" Patterson-Kelley water heater and
controls
2 York air cooling units and water-cooled
"Freon" compressor
Electrical testing equipment, instruments,
small tools, lockers, office furniture,
work benches, etc.



First Aid & Service House - Bldg. 719
Looking Northwest
Project 9733
Clinton Engineer Works
Roll 811-9 Date 3-13-44



Cafeteria - Bldg. 708
Looking Northwest
Project 9733
Clinton Engineer Works
Roll 811-11 Date 3-13-44

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SUMMARY BUILDING DATA

- (1) Building No. - 719
- (2) Name - FIRST AID & HOSPITAL BUILDING
- (3) Date Construction Started - April 10, 1943
- (4) Date Start Up - August 1, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - November 11, 1943
- (6) Date Construction Completed - October 20, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction - 1 story wood frame gabled structure with concrete block and reinforced concrete wall and pier with spread footing foundations; wood and concrete floor; gabled roof covered with asphalt shingles; 1" T & G drop siding, sheathing and decking with building paper insulation between siding and decking; gypsum board ceiling throughout with the exception of air conditioning room; rock board lining, partitions covered both sides; 2" balsum wool insulation for ceilings and walls of instrument room and animal service rooms; wooden doors, frames, sash and louvres; wood and concrete entrance platforms and steps.
- (9) Dimensions - Main Structure 124' 0" x 37' 10", 14' 4" eaves, 10' 10" ceiling, 9' 6" gable; and 72' 4" x 37' 10", 14' 4" eaves, 10' 1" ceiling, 9' 6" gable.
Air Conditioning Room 11' 6" x 14' 0", 14' 4" eaves, 13' 4" ceiling, 2' 10 1/2" gable.
- (10) Total Volume - 138,500 cu. ft.
- (11) Sq. Ft. Floor & Type - 6,750 sq. ft. wood, of which 4033 sq. ft. are covered with battleship linoleum; 1003 sq. ft. concrete 4" thick.
- (12) No. Rooms - 40 - 9 Offices, Recovery Room, Conference Room, Examination Room, Supply Room, Utility Room, First Aid Room, Dark Room, Waiting Room, Storeroom, Linen Room, Women's Toilet Room, Women's Lounge, Men's Toilet Room, 5 Closets, 4 Laboratories, Instrument Room, Air Conditioning Room, 3 Animal Service Rooms, 4 Vestibules.
- (13) No. Concrete Blocks - 1730-8" x 8" x 16" concrete blocks

- (14) No. Board Ft. Lumber - Total 80,500 b. ft. - 17,000 bd. ft. decking and sheeting; 7,000 bd. ft. drop siding; 48,000 bd. ft. framing; 3,500 bd. ft. flooring; 7,500 sq. ft. gypsum board; 20,000 sq. ft. $\frac{3}{4}$ " rock board.
- (15) No. Cu. Yds. Concrete - 120 cu. yds.
- (16) Sq. Roofing & Type - 92 sqs. Asphalt Shingles, 1 sq. Built-Up
- (17) No. Tons Structural Steel - None
- (18) Bldg. Services & Facilities - Steam; steam heat; propane gas; air; hot water; filtered water; raw water; process and sanitary sewers; plumbing and drainage; toilet and washroom facilities; air conditioning; ventilation; fume exhaust system; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C; and telephone.
- (19) Additions & Changes - Added: Linoleum flooring to medical wing, dark room, doors, hood ventilation; Auxiliary Electric Generator Building--wood frame 12' 7" x 8' 7", 8' 0" eaves, rock board lining, exposed studding, concrete curtain wall foundation, concrete floor and shed roof w/ Built-Up roofing--used to house stand-by gasoline driven motor generator set 5 KW 110 V, A.C., 60 C.
- Changes: Relocated doors and dark room ventilating fan, service pipe connections changed, fresh air inlet duct changed.
- (20) Major Bldg. Equipment - Start up date for the following list of major building equipment was same as shown in part (4):
- 1 X-ray machine
 - 1-24" x 72" Patterson-Kelley hot water heater and controls
 - 1 York-Ice and machine, "Freon" compressor, and air supply unit
 - 1-3/4 KW Clarage fan and motor
 - Miscellaneous laboratory, medical, and office furniture and equipment, photographic equipment, instruments, etc.

SUMMARY BUILDING DATA

- (1) Building No. - 720
- (2) Name - PATROL HEADQUARTERS & FIRE STATION
- (3) Date Construction Started - October 4, 1943
- (4) Date Start Up - November 27, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 7, 1943
- (6) Date Construction Completed - November 23, 1943
- (7) Date Accepted by Government - December 9, 1943
- (8) Type of Construction - 1 story wood frame structure with reinforced concrete curtain wall foundations; reinforced concrete floor; combined flat and shed roof sloped two ways with sheet metal ventilators and covered with Built-Up roofing; 1" T & G sheeting, decking and drop siding with building paper insulation between siding and decking; wood studded partitions, one side covered with rock board, exposed rafters unceiled; wooden doors, frames, and sash, with wooden platform and steps at the west entrance; overhead wooden sliding garage doors.
- (9) Dimensions - 80' 0" x 50' 0", 15' 2" eaves, 11' 2" minimum ceiling, 12' 3 1/2" maximum ceiling.
- (10) Total Volume - 60,800 cu. ft.
- (11) Sq. Ft. Floor & Type - 3800 sq. ft. concrete 4" thick.
- (12) No. Rooms - 11 - 6 Offices, Car Storage Room, Assembly Room, Locker Room, Toilet & Shower Room, and Storage Room.
- (13) No. Board Ft. Lumber - 27,000 bd. ft. total - 14,000 bd. ft. frame; 8,500 bd. ft. sheeting and decking; 4,500 bd. ft. drop siding; 4,100 sq. ft. 1/2" rock board.
- (14) No. Cu. Yds. Concrete - 133 cu. yds.
- (15) Sq. Roofing & Type - 40 s.q.s. Built-Up Roofing.
- (16) No. Tons Structural Steel - None.

- (17) Bldg. Services & Facilities - Steam; steam heat; hot water; filtered water; plumbing and drainage; sanitary sewers; toilet and washroom facilities; lighting 110 V, A.C., 60 C; and telephone.
- (18) Additions & Changes - Added doors; omitted partitions for heater room.
- (19) Major Bldg. Equipment - None with the exception of a 36" x 96" vertical Patterson-Kelly hot water heater and controls, office furniture, and lockers.

SUMMARY BUILDING DATA

- (1) Building No. - 723
- (2) Name - LAUNDRY
- (3) Date Construction Started - January 18, 1944
- (4) Date Start Up - March 25, 1944
- (5) Date Acceptance Approved by CLINTON LABORATORIES - March 18, 1944
- (6) Date Construction Completed - February 19, 1944
- (7) Date Accepted by Government - March 20, 1944
- (8) Type of Construction - 1 story wood frame structure with concrete curtain wall and reinforced concrete pier with spread footing foundations; concrete floor; gabled roof covered with asphalt shingles and having sheet metal roof ventilators; 1" sheeting, decking and drop siding with building paper insulation between decking and sheeting; interior walls, partitions and ceilings of office, testing rooms, toilet rooms, glove washing room, and storeroom lined with rock board; and wooden doors, frames, louvres, and sash.
- (9) Dimensions - 30' 0" x 60' 0", 10' 3" eaves, 7' 6" gable, 9' 6" minimum ceiling.
- (10) Total volume - 27,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 1340 sq. ft. concrete 4" thick.
- (12) No. Rooms - 11 - Washroom, Pressing Room, Office, 2 Test Rooms, 2 Toilet Rooms, Receiving Room, Storeroom, Sorting Room, Glove Washing Room.
- (13) No. Board Ft. Lumber - Total 15,500 bd. ft. - 5000 bd. ft. sheeting and decking; 2500 bd. ft. drop siding; 8000 bd. ft. frame; 2000 sq. ft. 1" rock board.
- (14) No. Cu. Yds. Concrete - 58 cu. yds.
- (15) Sq. Roofing & Type - 31 sq. Asphalt Shingles.
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; air; filtered water; hot water; raw water; plumbing and drainage; toilet & washroom facilities; sanitary sewers; lighting 110 V, A.C., 60 C; power 440 V,

3 P, 60 C; telephone; toilet and washroom facilities.

(18) Major Bldr. Equipment - Start up date of the following equipment same as shown in part (4).

The following list of equipment was installed:

- 1 Richmond 30" x 72" hot water heater and controls.
- 2 Food washers, 36" x 36"
- 2 Extractors, dia. 17"
- 1 Tumbler dryer, 36" x 30"
- 1 Darning machine
- 1 Coverall press
- 1 Trouser press
- 2 Mushroom presses
- 1 Marking machine

SUMMARY SWIMMING AREA

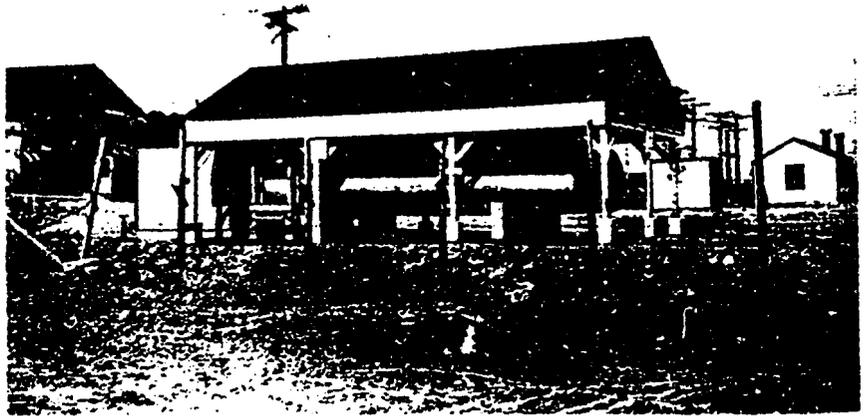
- (1) Building No. - 724
- (2) Name - GAS STATION
- (3) Date Construction Started - July 7, 1943
- (4) Date Start Up - August 15, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 13, 1943
- (6) Date Construction Completed - September 1, 1943
- (7) Date Accepted by Government - December 18, 1943
- (8) Type of Construction - One 1000-gallon gasoline storage tank set on a 6" concrete pad 3' 0" below finish grade and one electric driven gas pump mounted on concrete pad 8" above grade 25' 0" from center line of tank.
- (9) Dimensions - Tank 10' 8" long x 4' 0" in diameter.
- (10) Total Capacity - 1000 gallons.
- (11) No. Cu. Yds. Concrete - 4 cu. yds.
- (12) Bldg. Services & Facilities - Power 110 V, single phase, A.C., 60 C.
- (13) Additions & Changes - None.
- (14) Major Bldg. Equipment - The major building equipment installed is same as listed under part (8), and start up date for this equipment is same as date shown under part (4).

PROPERTY BUILDING DATA

- (1) Building No. - 725
- (2) Name - LAMPING GARAGE BUILDING
- (3) Date Construction Started - March 20, 1943
- (4) Date Start Up - August 13, 1943
- (5) Date Acceptance Approved by CLINTON L. BOGGS, M.D. - December 13, 1943
- (6) Date Construction Completed - November 22, 1943
- (7) Date Accepted by Government - December 17, 1943
- (8) Type of Construction - 1 story wood frame T-shaped structure with concrete curtain wall and reinforced concrete pier with spread footing foundations; concrete floor; original building gabled roof covered with asphalt shingles, first increase shed roof covered with built-up roofing; 1" sheeting and drop siding with building paper insulation between siding and decking; overhead roller garage doors; office partitions wood studded, one side covered with rock board; wooden doors, frames, louvres, and sash.
- (9) Dimensions - Original Building 25' 0" x 64' 0", 9' 6" eaves, 9' 0" minimum ceiling, 8' 3" cable.
Grease Rack Lab 18' 0" x 36' 0".
First Increase 40' 0" x 40' 0", 12' 0 7/8" eaves, 11' 0" minimum ceiling, 11' 11" maximum ceiling.
- (10) Total Volume - 45,000 cu. ft.
- (11) Sq. Ft. Floor & Type - 3,715 sq. ft. concrete 4" thick.
- (12) No. Rooms - 4 - 2 offices, Parking Garage, Truck Storage and Repair Garage.
- (13) No. Board Ft. Lumber - Total 30,000 bd. ft. - 4,000 bd. ft. drop siding; 13,000 bd. ft. frame; 3,000 bd. ft. sheeting and decking.
- (14) No. Cu. Yds. Concrete - 105 cu. yds.
- (15) Sq. Roofing & Type - 18 sqs. Asphalt shingles, 19.46 sqs. Built-Up Roofing
- (16) No. Tons Structural Steel - None.
- (17) Bldg. Services & Facilities - Steam; steam heat; air;

filtered water; plumbing and drainage; sanitary
sewers; lighting 110 V, A.C., 60 C; power 440 V,
3 P, 60 C; and telephone

- (18) Additions & Changes - added: First addition, truck
storage and repair garage building and facilities;
outside auto hoist; floor drainage, steam heat,
filtered water and air piping; compressor and air
pipe.
Changes: Changed roof on original building
from Built-Up to asphalt shingles; changed floor in
original building from cinders to concrete.
- (19) Major Bldg. equipment - Start up date for air compressor
and lift - approximately October 25, 1943.
The major equipment installed was as follows:
1 Hydraulic automatic car lift, 8000 lb.
capacity, and air compressor.



Propane Storage Tanks - Bldg. 726
Looking North East
Project 9733
Clinton Engineer Works
Roll 97-13 Date 10-11-43



Storage Platform - Bldg. 714
Looking South East
Project 9733
Clinton Engineer Works
Roll 120-31 Date 11-11-43

SUMMARY BUILDING DATA

- (1) Building No. - 726
- (2) Name - HYDRO-PNEUMATIC WATER TANKS
- (3) Date Construction Started - June 21, 1943
- (4) Date Start Up - September 1, 1943
- (5) Date Original Bldg. & Lines Acceptance Approved by CLINTON LABORATORIES - December 6, 1943
Date First Increase Acceptance Approved by CLINTON LABORATORIES - February 16, 1944
- (6) Date Construction Completed Original Bldg. - October 16, 1943.
Date Construction Completed First Increase - February 5, 1944.
- (7) Date Original Bldg. & Lines Accepted by Government - December 10, 1943
Date First Increase Accepted by Government - March 20, 1944.
- (8) Type of Construction - 1 story wood frame gabled open shed with 1 story gabled wood frame meter house attached to north end with concrete curtain wall and reinforced concrete pier with spread footing foundations; reinforced concrete and cinder floor; 1" T & G sheeting and asphalt shingle roof; meter room with sheet metal ventilator; meter room covered with same 2' 0" below the square of the roof; wooden walkways, steps, doors, frames, and louvres. Also included with this building is 2600 ft. of 1" schedule 40 and 350 ft. of 3/4" schedule 40 steel pipe for underground propane gas service to Buildings 105, 205, 706-A, 706-B, 706-C, 717-B and 719.
- (9) Dimensions - Gas Storage Shed 35' 6" x 20' 6", 8' 0" eaves, 5' 0" gable, 8' 6" minimum head clearance.
Meter House 10' 0" x 8' 0", 7' 10" eaves, 2' 3" gable, 7' 2" minimum head clearance.
- (10) Total Volume - 14,600 cu. ft.
- (11) Sq. Ft. Floor & Type - Shed 900 sq. ft., cinder; Meter House 80 sq. ft., concrete 4" thick.
- (12) No. Rooms - 2 - Gas Storage Shed, Meter Room.
- (13) No. Board Ft. Lumber - Total 4600 bd. ft. - 1500 bd. ft. sheeting and decking, 600 bd. ft. drop siding, 2500 bd. ft. frame.
- (14) No. Cu. Yds. Concrete - 28 cu. yds.
- (15) Sq. Roofing & Type - 957 sqs. Asphalt Shingles

- [REDACTED]
- (16) No. Tons Structural Steel - None
 - (17) Bldg. Services & Facilities - Propane gas mains; steam; steam heat; lighting 110 V, A.C., 60 C.
 - (18) Additions & Changes - All overhead propane gas lines removed from pipe supports and relocated underground.
First Increase - Added: 400' 1" schedule 40 underground propane gas service line to Building 706-C.
 - (19) Major Bldg. Equipment - The major building equipment was composed of only 2-3500 gallon propane gas storage tanks, meter and piping.

██████████

BUILDING REPORT

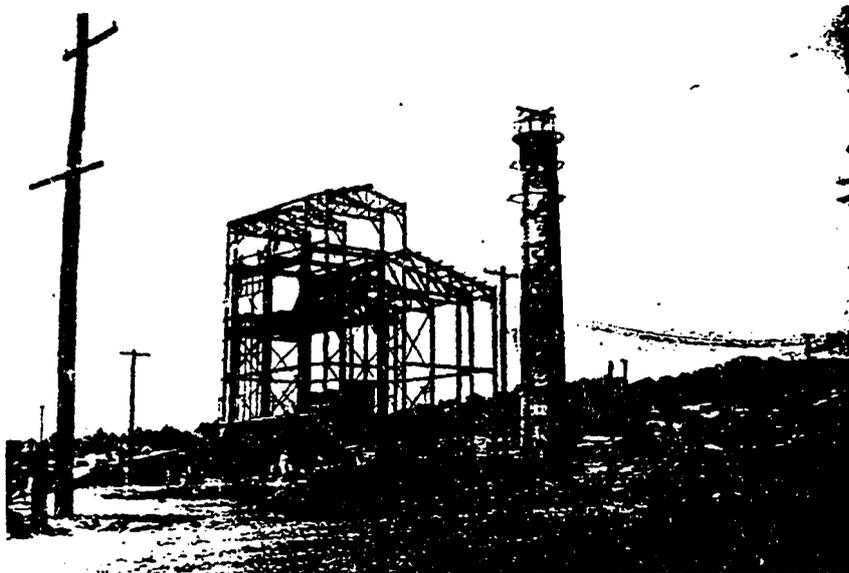
- (1) Building No. - 735
- (2) Name - TRAINING ROOM BUILDING
- (3) Date Construction Started - August 13, 1943
- (4) Date Start Up - September 21, 1943
- (5) Date Acceptance Approved by MILITARY LABORATORY - December 6, 1943
- (6) Date Construction Completed - October 30, 1943
- (7) Date Accepted by Government - December 9, 1943
- (8) Type of Construction - 1 story wood frame structure with concrete curtain wall foundations; reinforced concrete piers with spread footing; 1" T & G single wood floor; gable roof covered with asphalt shingles; 1" T & G sheathing, decking, and drop siding with building paper insulation between siding and decking; gypsum board ceiling; rock board partitions and lining; and wooden doors, frames, sash, louvres, and steps.
- (9) Dimensions - 72' 0" x 40' 0" x 24' 10" high.
- (10) Total Volume - 57,600 cu. ft.
- (11) Sq. Ft. Floor & Type - 2720 sq. ft. 1" T & G single wood.
- (12) No. Rooms - 8 - Reading Room, Conference Room, 2 Supervisor's Offices, Clerical Office, Classified Material Library, Men's Toilet Room, Women's Toilet Room.
- (13) No. Bd. Ft. Lumber - Total 37,500 bd. ft. - 10,000 bd. ft. sheathing, decking, and siding; 24,000 bd. ft. frame; 3,500 bd. ft. flooring; 2880 sq. ft. 3/8" gypsum board; 5000 sq. ft. 1/2" rock board.
- (14) No. Cu. Yds. Concrete - 27 cu. yds.
- (15) Sq. Roofing & Type - 31.60 sqs. Asphalt Shingles.
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Steam; steam heat; hot water; filtered water; sanitary sewers; lighting 110 V, a.c., 60 C.; toilet and washroom facilities; and telephone.
- (18) Additions & Changes - None

(19) Major Bldg. equipment - None with the exception of a
20" x 30" Richmond water heater and controls, and
miscellaneous furniture and equipment.

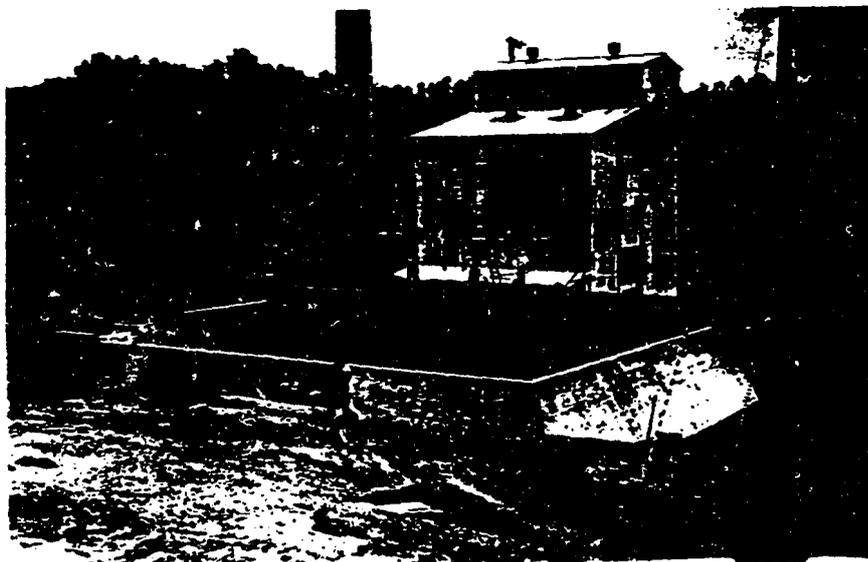
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STEEL BUILDING DATA

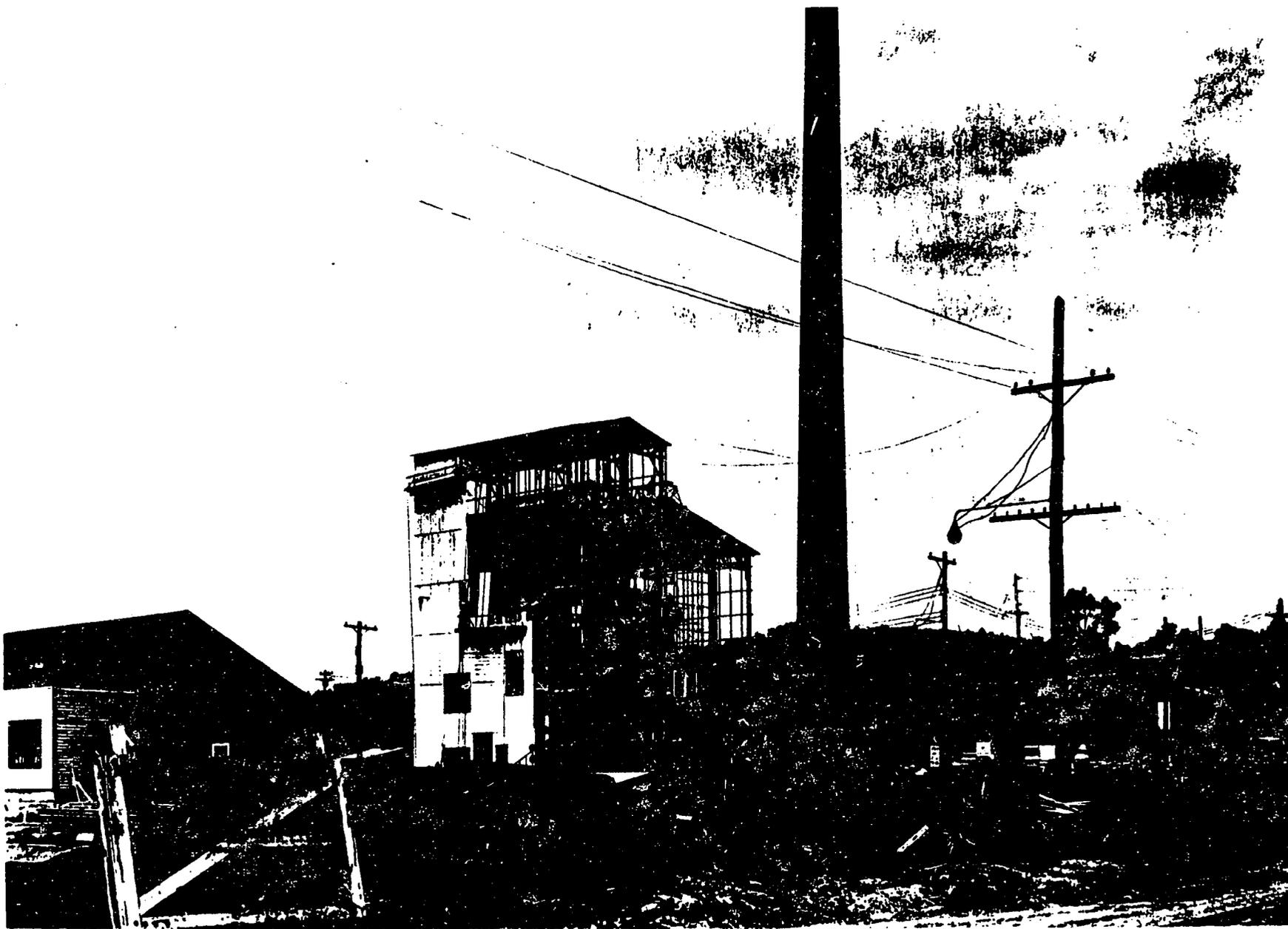
- (1) Building No. - 737
- (2) Name - RAY HALL
- (3) Date Construction Started - September 9, 1943
- (4) Date Start Up - December 5, 1943
- (5) Date Acceptance Approved by Clinton Laboratories - November 12, 1943.
- (6) Date Construction Completed - October 19, 1943
- (7) Date Accepted by Government - November 17, 1943
- (8) Type of Construction - 1 Story wood frame, open shed with concrete pier foundations, 8" crushed stone floor, gable roof covered with asphalt shingles, 1" T. & G. sheathing, 1" T. & G. 45° partition and wooden benches.
- (9) Dimensions - 14'-6" x 14'-6", 8'-0" Eaves, 3'-7½" Gable.
- (10) Total Volume - 2,523 Cu. Ft.
- (11) Sq. Ft. Floor & Type - 210 Sq. Ft. (Crushed Stone)
- (12) No. Rooms - 2 (White Waiting Room & Colored Waiting Room)
- (13) No. Board ft. Lumber - Total 1300 Bd. Ft.; 800 Bd. Ft. 1" T. & G.; 700 Bd. Ft. Frame.
- (14) No. Cu. Yds. Concrete - 2 Cu. Yds.
- (15) Sq. Roofing and Type - 2.74 Sqs. Asphalt Shingles
- (16) No. Tons Structural steel - None
- (17) Bldg. Services - Lighting (110V) A. C. 30 C
- (18) Additions and Changes - Lighting Added.
- (19) Major Bldg. Equipment - None.



Boiler House - Bldg. 801
Looking Northwest
Project 9733
Clinton Engineer Works
Roll 24-36 Date 5-22-43



Boiler House & Reservoir - Bldgs. 801 & 802
Looking South
Project 9733
Clinton Engineer Works
Roll 44-15 Date 7-14-43



U. S. Engineer Office
Oak Ridge, Tennessee

Clinton Engineer works - Oak Ridge, Tennessee
Contract No. W-7412-eng-23
TNX Area - Steam Plant (Bldg. 805).

10 June 1943
No. 54.

SUMMARY BUILDING DATA

- (1) Building No. - 801
- (2) Name - Boiler House
- (3) Date Construction Started - March 15, 1943
- (4) Date Start Up - First Boiler, August 5, 1943;
Second Boiler, September 13, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - January 11, 1944
- (6) Date Construction Completed - October 15, 1943
- (7) Date Accepted by Government - January 14, 1944
- (8) Type of Construction - 4 story structural steel and wood frame building covered with corrugated asbestos siding fastened to wooden girts; asbestos roof ventilators; high portion of roof is composed of gabled wood truss construction, intermediate section is made up of wood lean-to truss construction, lower sections of both wood frame lean-to construction; reinforced concrete ground and operating floor slabs; third and fourth floors and walkways are made up of subway grating and wood; 8" brick fire wall partition for Ash Removal Room and Compressor Room; reinforced concrete wall and pier foundation with spread footings; wooden doors, frame, sash, louvres and stairways; also included with this structure is a sub-level reinforced concrete coal unloading hopper and conveyor pit, reinforced concrete smoke-stack partially lined with fire brick, and coal storage lot.
- (9) Dimensions - Main steel frame structure 52' 2 3/4" x 59' 7", height of eaves 74' 0 3/4" & 52' 8 3/4" & 52' 8 3/4", 14' clearance ground floor, 33' 0" maximum clearance operating floor; pump room lean-to 19' 1" x 52' 2 3/4", 13' 4" eaves, 12' 0" minimum head clearance.
Elevator Pit 25' 0" x 10' 0", 9' 0" deep.
Conveyor Shed 11' 0" x 10' 0", 4' 0" eaves.
Stack 175' 0"; bottom 12' 10 3/4" O.D., 11' 2 3/4" I.D.; top 6' 19" O.D., 6' 0" I.D.
Coal Storage Area 100' 0" x 75' 0".
- (10) Total Volume - 234,394 cu. ft.
- (11) Sq. Ft. Floor & Type - 6,978 sq. ft. concrete 4" thick;
482 sq. ft. wood; 525 sq. ft. of sub-way grating.

- ██████████
- (12) No. Rooms - 11
Ground Floor: Compressor Room, Pump Room, Ash Removal Room, Conveyor Pit & Shaft, Laboratory, and Vestibule.
Operating Floor: Operating Room, Office, Washroom, Locker Room, and two Inspection & Walkway Levels.
Fourth Floor: Coal Conveyor & Coal Unloading Room.
- (13) No. Board Ft. Lumber - 27,000 bd. ft. total - 26,000 bd. ft. frame; 1000 bd. ft. flooring.
- (14) No. Cu. Yds. Concrete - 703 cu. yds. class A, building; 114 cu. yds., stack.
- (15) Sq. Roofing & Type - 55.8 sqs. Corrugated Asbestos.
- (16) No. Tons Structural Steel - 104 tons.
- (17) Bldg. Services & Facilities - Steam; steam heat; air; raw water; filtered water; soft water; hot water; plumbing and drainage; sanitary sewers; toilet and washroom facilities; propane gas; outside flood-lighting; lighting 110 V, A.C., 60 C; power 220/440 V, 3 P, 60 C & 2300 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Added: Pump Room & Equipment Foundations, Laboratory 12' 0" x 8' 0" with wood studded and fibre board partitions, wooden louvres for coal unloading room, floor over elevator pit, and additional radiation.
- (19) Major Bldg. Equipment -
Start up date No. 1 Boiler - August 5, 1943
Start up date No. 2 Boiler - September 13, 1943
Start up date Water Softeners - July 29, 1943
Start up date Coal Handling Equipment - July 26, 1943
Start up date No. 1 Compressor - July 31, 1943
Start up date No. 2 Compressor - September 21, 1943

The following list of major equipment was installed:

2 single set Walsh & Veidner, cross drum type, water tube boilers for 175 P.S.I. working pressure rated as 530 H.P., complete with 2 Foster super heaters with Vulcan shot blowers; 2 Coxo chain grate stokers 2 Sturtevant stoker engines; 2 draft gauges; 10 pressure gauges; 10 Vulcan soot blowers; 2 Bailey boiler meters; 2 Allan-Sherman-Hoff Ash hoppers; 2 feed water regulators; 1 overhead coal bunker; boiler feed and blow-off piping, blow-off tank, air duct and breeching, walkways, etc.

- 1-175' reinforced concrete tapered stack.
- 1 Link-Belt coal handling system, 20 tons per hour.
- 3-2" Turbine-driven filtered water pumps connected to 17 H.P., 3500 R.P.M. Erie National steam turbine.
- 2-2" Worthington horizontal single stage centrifugal pump connected to 15 H.P., 440 V, 3 P, 60 C, 3600 R.P.M. motor.
- 1 Permutit, 75,000 lbs. per hour, vertical deaerating feed water heater.
- 2-60" I.D. Zoo-Dur Permutit water softeners having a capacity of 75 G.P.M. per sq. ft., complete with one salt storage tank and two brine measuring tanks, necessary gauges, alarms, and controls.
- 4-7½" x 4½" x 10" Worthington, type VC, steam pumps.
- 1 Permutit chemical feed pump.
- 1 Worthington 12" x 11", type HB, single stage air compressor with V belt drive and 150 H.P., 500 R.P.M., 2300 V, 3 P, 60 C motor.
- 1-36" x 96" air receiver, 125#.
- 1 Pipe line after cooler.
- 1 Penn. 2-stage duplex direct connected air compressor, type D.C.E., size 17" x 16" x 12".
- 1-20" x 60" Richmond water heater and controls.
- Unit heaters, valves, instruments, laboratory and office furniture, etc.

SUMMARY BUILDING DATA

- (1) Building No. - 202
- (2) Name - RESERVOIR
- (3) Date Construction Started - April 7, 1943
- (4) Date Start Up - July 16, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
October 4, 1943
- (6) Date Construction Completed - August 28, 1943
- (7) Date Accepted by Government - November 20, 1943
- (8) Type of Construction - Rectangular concrete structure,
open top with un-reinforced concrete gravity
walls on three sides and with reinforced concrete
T-type wall on south side adjacent the reservoir
pump house structure, un-reinforced concrete
floor slab supporting gravity walls, floor slab
in four sections by keyed construction joints.
- (9) Dimensions - Outside 85' 0" x 58' 10", average height
13' 0".
Inside 50' 0" x 70' 0", average storage height 9' 9".
- (10) Total Volume - 250,000 gallons
- (11) Sq. Ft. Floor & Type - 3500 sq. ft. concrete 8" thick
- (12) No. Board Ft. Lumber - None
- (13) No. Cu. Yds. Concrete - 685 cu. yds.
- (14) Sqs. Roofing & Type - None
- (15) No. Tons Structural Steel - None
- (16) Building Services - Raw water; sanitary sewers; light-
ing 110 V, A.C., 60 C
- (17) Additions & Changes - None
- (18) Major Bldg. Equipment - None with the exception of valves

SUMMARY BUILDING DATA

- (1) Building No. - 805
- (2) Name - PURCHASED POWER
- (3) Date Construction Started - February 22, 1943
- (4) Date Start-Up - April 5, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - Same as date for Building No. 501
- (6) Date Construction Completed - April 5, 1943
- (7) Date Accepted by Government - February 2, 1944
- (8) Type of Construction - 5.7 miles three-wire, single pole and cross-arm transmission line connecting plant site with 12 KV, 3 P, A.C., 60 C, 12,000 V, Norris Rural Electrification System of the Tennessee Valley Authority. Also, two 75 KVA booster stations; 12 KV metering and switching equipment at the origin and at the junction of the River Pump House Line; and transformer bank at the plant site composed of three Maloney transformers, 200 KVA, single P, 60 C, primary 11,500 V - secondary 2300/575 V, substation framing, 2-current transformers 7500 V, 150/5 Amp, 2-current transformers 50/5 Amp, two oil circuit breakers, 7500 V, 400 Amp, one disconnect switch, 3 P.S.T., six disconnect switches S.P.S.T., 7500 V, 400 Amp.
- (9) Dimensions - Substation Framing 18' 0" x 24' 0", 17' 0" high. Transmission Line 5.7 miles.
- (10) No. Ft. & Size of Wire - 91,000' 1/0 A.C.S.T. wire, 650' 2/0 stranded copper cable, 110' 2/0 2300 V insulated copper cable, 2000' 3/8" 3MDC ground and guy wire.
- (11) No. Poles & Cross Arms - 29-35' Class 5 Poles, 28-40' Class 5 Poles, 6-45' Class 5 Poles, 69-8' cross arms.
- (12) Capacity of Substation - 800 KVA.
- (13) No. Cu. Yds. Concrete - 2 cu. yds.
- (14) No. Tons Structural Steel - None.
- (15) Additions & Changes - Contract #TV-7784 by which construction power was furnished the K. I. du Font de Nemours

[REDACTED]

& Co., Inc., Clinton Engineer works, by the Tennessee Valley Authority, was terminated on January 30, 1944; however, the above transmission line was maintained by T.V.A. in accordance with Contract TV-78297 for the furnishing of permanent power to Clinton Laboratories by T.V.A.

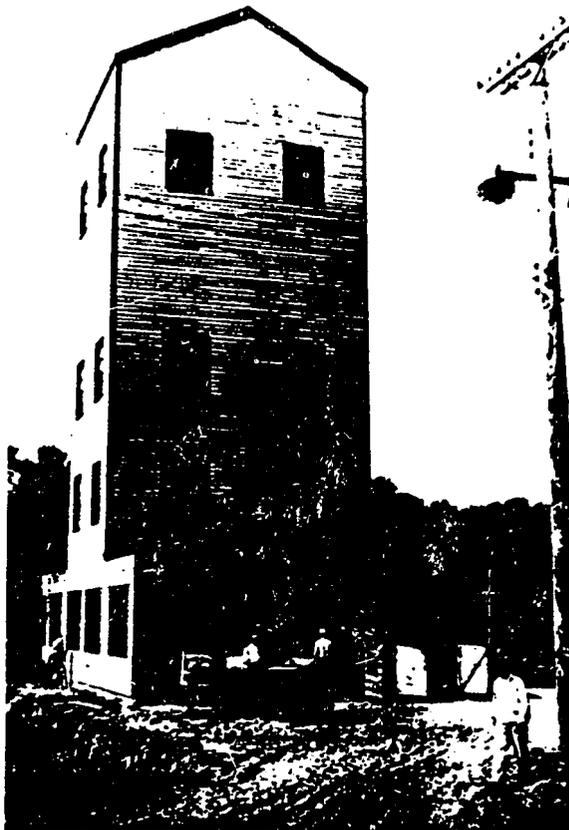
Contract TV-78297 included the construction of a 13.8 KV transmission line of sufficient capacity to transmit not less than 5,000 KVA from the K-25 area to the existing substation on the plant site, a distance of approximately 3 miles. The type of construction used for this line was as follows: single pole construction, 40' class A, treated pole carrying 2 cross arms supporting suspension insulators and one overhead 3/16" ground wire and three 1/0 A.C.S.R. conductors.

This contract also included the installation of one 375 KVA, 13,000 V, 3 P, step-regulator, complete with isolating and by-pass switches, structure, fences, and accessories by T.V.A.

The Bucking transformer station temporarily installed by T.V.A., composed of 3-66 KVA, single P, 1320/880-440 V series transformers, was replaced at a later date by the T.V.A. with an auto transformer 4000 KVA, 3 P, 80 C, 15,000 V, suitable for reducing line voltage on a nominal 13.8 KV, 3 P system, to 11.73 KV, which was furnished by du Pont.

(16) Bldg. Services & Facilities - None

(17) Major Bldg. Equipment - See part (E), Type of Construction.



Water Treatment House - Bldg. 807
Looking North
Project 9733
Clinton Engineer Works
Roll 97-2 Date 10-11-43

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[REDACTED]

SUMMARY BUILDING DATA

- (1) Building No. - 807
- (2) Name - WATER TREATMENT HOUSE BUILDING
- (3) Date Construction Started - August 12, 1943
- (4) Date Start Up - October 11, 1943 (partial)
- (5) Date Acceptance Approved by CLINTON LABORATORIES - March 6, 1944
- (6) Date Construction Completed - December 25, 1943
- (7) Date Accepted by Government - March 9, 1944
- (8) Type of Construction - 4 story structural steel and wood frame building with one story wood frame gabled annexes on the north and south ends. Reinforced concrete wall and pier foundations with spread footings; main floor reinforced concrete; second, third and fourth floors 2" T & G wood flooring; 1" T & G sheathing, decking and drop siding with building paper insulation between sheathing and siding, sheathing nailed to wood girts bolted to steel frame work; asphalt shingle roof; wooden stairways, doors, frames and sash.
- (9) Dimensions - Main Structure 24' 0" x 26' 2"; 60' 6" eaves; 7' 3" gable; 10' 0" minimum clearance first and second floors, 18' 0" third floor, and 15' 0" fourth floor.
North Annex 22' 0" x 26' 2"; 12' 6" eaves; 6' 3" gable; 12' 0" minimum head clearance.
South Annex 14' 0" x 66' 2"; 12' 6" eaves; 6' 3" gable; 12' 0" minimum head clearance.
- (10) Total Volume - 60,408 cu. ft.
- (11) Sq. Ft. Floor & Type - 1727 sq. ft. concrete 4" thick, 870 sq. ft. 2" T & G wood flooring of which 240 sq. ft. are covered with mastic flooring
- (12) No. Rooms - 6 - First Floor; Operating and Toilet Rooms; Second floor; Office and Laboratory; Third and Fourth floors; 2 Work Rooms.
- (13) No. Board Ft. Lumber - 35,800 bd. ft. total - 20,000 bd. ft. drop siding, decking and sheathing; 3000 bd. ft. 2" T & G flooring; 12,800 bd. ft. frame.
- (14) No. Cu. Yds. Concrete - 100 cu. yds.
- (15) Sq. Roofing - 21.12 sqs. Asphalt Shingles.
- (16) No. Tons Structural Steel - 33.3

- (17) Bldg. Services & Facilities - Air; steam; steam heat; raw water; filtered water; hot water; demineralized water; toilet and washroom facilities; sanitary sewers; plumbing and drainage; calgon; peroxide; process lines; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C; telephone.
- (18) Additions & Changes - Added: 1 1/2" Toured Mastic Floor for Laboratory.
- (19) Major Bldg. Equipment - Start up date for Water Softener October 11, 1943;
Start up date for Calgon and Peroxide - December 20, 1943;
Start up date for Demineralized Water Equipment - January 20, 1944
Start up date for Hot Water Recirculating System - December 5, 1943.

The majority of equipment installed in this building was mainly water treatment equipment furnished by the Permutit Company, which supplied demineralized water, hot water, softened water, calgon and peroxide for the 105 & 205 Process Buildings. Listed below are the major pieces of equipment installed herein:

- 2-4' 0" x 8' 0" Zoo-Carb softener meters and accessories.
- Regenerating equipment consisting of 1-40 gal. acid crook and accessories.
- 2-60" I.D. x 30" lead line dilute acid tank.
- 1-4' 0" x 2' 6" alkali tank and lightening mixer.
- 2-36" I.D. x 8' 0" de-acidite unit.
- 2 alkali iron pumps and motors.
- 1-10' 0" I.D. x 14' 0" stainless steel demineralized water storage tank.
- 1 strong acid storage tank.
- 1 sulphuric storage tank.
- 1-30 sq. ft. vent condenser.
- 1 tubular recirculating heat exchanger.
- 1 closed heater.
- 1 CO₂ wallace & Tiernan feeder.
- 1 O₂ wallace & Tiernan feeder.
- 1 acid feeder.
- 1 calgon feeder
- 1 hydrogen peroxide feeder.
- 1 spare feeder.
- 2-1000 G.F.M. recirculating pumps for de-aerator.
- 2-100 G.F.M. Booster Pumps.
- 2-100 G.P.M. 800' head Booster Pumps.
- 1 stainless steel pipe line mixer.
- 1 vacuum deaerator, 36" x 14' 0" designed for flow of 80 to 100 G.F.M.

Instruments, laboratory and office furniture
and equipment, piping, valves, accessories,
etc.

SUMMARY BUILDING DATA

- (1) Building No. - 511
- (2) Name - DRINKING WATER WELL BUILDING
- (3) Date Construction Started - February 3, 1945
- (4) Date Start Up - April 24, 1945
- (5) Date Acceptance Approved by CLINTON LABORATORIES - October 27, 1945
- (6) Date Construction Completed - June 1, 1945
- (7) Date Accepted by Government - November 2, 1945
- (8) Type of Construction - 1 story wood frame structure, concrete curtain wall foundation and floor slab, 1" sheathing, decking and drop siding with building paper insulation between siding and decking, gabled roof with roll roofing. This building is located over 8" I.D. drilled well 600' deep. Also included with this structure is wood storage tank having concrete foundation and flat roof.
- (9) Dimensions - Pump House 14' 4" x 15' 4", 10' 0" eave, 1 1/2" gable, 9' 0" head clearance.
Tank 7' 0" I.D., 7' 0" deep, bottom 16" above ground.
- (10) Total Volume - 2,101 cu. ft.
- (11) Total Capacity of Tank - 2,000 gallons
- (12) Sq. Ft. Floor & Type - 156 sq. ft. concrete 4" thick
- (13) No. Rooms - 1 - Pump Room
- (14) No. Board Ft. Lumber - 1750 bd. ft. total - 750 bd. ft. drop siding, sheathing and decking, 1000 bd. ft.
- (15) No. Concrete - 12 cu. yds.
- (16) No. Roll Roofing - 32 sqs. Roll Roofing
- (17) No. Lbs. Structural Steel - None
- (18) Bldg. Services & Facilities - Drinking water; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C.
- (19) Additions & Changes - Change Building Code from TC-52 to 511; lined Pump Room with 1/2" fibre board; removed pump and equipment per request of Clinton Laboratories

on P.W.O. 99.

(20) Major Bldg. Equipment - Start up date drinking water pump - April 14, 1943.

The major equipment installed in this building was as follows:

- 1 Layne deep-well turbine pump, 250 G.P.M., with a discharge pressure of 85# having a vertical hollow shaft motor 220 V, 3 P, 60 C, 1750 R.P.M.
- 1 Wilson Hypo-Chlorinator, pulse-feed type.
- 1 7' 0" I.D. x 7' 0" deep wood stave drinking water storage tank.

SUMMARY BUILDING DATA

- (1) Building No. - 812
- (2) Name - RESERVOIR PUMP HOUSE BUILDING
- (3) Date Construction Started - April 16, 1943
- (4) Date Start Up - July 19, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - November 22, 1943
- (6) Date Construction Completed - September 1, 1943
- (7) Date Accepted by Government - November 30, 1943
- (8) Type of Construction - 1 story brick, wood and frame structure with north side adjacent to south concrete wall of reservoir; reinforced concrete curtain wall foundations and concrete floor; fire water pump room composed of 8" brick walls, reinforced concrete beam and roof slab with A.C.M. roof ventilator; raw water pump room is a wood frame shed roof structure with 1" T & G sheeting, decking and drop siding with building paper insulation between siding and decking; and wooden doors and frames.
- (9) Dimensions - 16' 0" x 45' 5", 12' 4" & 13' 0" eaves, 10' 4" & 11' 6" minimum ceiling
- (10) Total Volume - 9,300 cu. ft.
- (11) Sq. Ft. Floor & Type - 664 sq. ft. concrete 4" thick
- (12) No. Rooms - 2 - Fire Water Pump Room and Raw Water Pump Room
- (13) No. Board Ft. Lumber - 2080 bd. ft. total - 1500 bd. ft. drop siding, decking and sheeting; 780 bd. ft. frame.
- (14) No. Cu. Yds. Concrete - 90 cu. yds.
- (15) Sq. Roofing - 6.19 sqs. Built-Up
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Raw water; steam; steam heat; sanitary sewers; plumbing and drainage; lighting 110 V, A.C., 60 C; power 2300 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Relocation underground gasoline storage tank.
- (19) Major Bldg. Equipment - Start up date for raw water pumps - July 19, 1943; start up date for fire pump - August 17, 1943.

The major equipment installed in this building is as follows:

2 Allis-Chalmers raw water pumps, 1000 G.P.M., type SJ, 175 ft. head, 1700 R.P.M.

2-60 H.P., 2200 V, 3 P, 60 C 1750 motors.

2-2200 V Oil-immersed Rowan, across the line, cubicles.

1 Dual drive Otto Reymann fire pump, type AF-10, 1000 G.P.M. with 290 ft. head at 1750 R.P.M.

1-45 CK Model, 6 cylinder Waukesha gasoline engine.

1-125 H.P. 2300 V, 3 P, 60 C, 1750 R.P.M. motor.

1-2200 V oil-immersed Rowan, across the line, cubicle starter.

SUMMARY BUILDING DATA

- (1) Building No. - 813
- (2) Name - FILTER PLANT BUILDING
- (3) Date Construction Started - April 28, 1943
- (4) Date Start Up - July 30, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 6, 1943
- (6) Date Construction Completed - October 4, 1943
- (7) Date Accepted by Government - December 9, 1943
- (8) Type of Construction - 2 story wood frame gabled structure with reinforced concrete curtain wall foundation; concrete and wood floors; 1" T & G sheathing, decking, and drop siding with building paper insulation between siding and decking; elevated wooden walkways, stairways around filter equipment; asphalt shingle roofing; fibre board partition lining; and wooden frames, doors and sash.
- (9) Dimensions - 25' 0" x 60' 0", 25' 0" eaves, 6' 3" gable, 11' 0" & 9' 6" head clearance.
- (10) Total Volume - 41, 595 cu. ft.
- (11) Sq. Ft. Floor & Type - 1416 sq. ft. concrete 4" thick, 1416 sq. ft. 1" T & G wood flooring and 2" platform decking,
- (12) No. Rooms - 3 - Filter Room, Operating Room, and Chemical Mixing Room
- (13) No. Board Ft. Lumber - 33,600 bd. ft. total - 9,600 bd. ft. sheathing and decking and siding; 200 sq. ft. $\frac{1}{2}$ " fibre board; 2000 bd. ft. flooring, decking and platform decking; 22,000 bd. ft. frame and damage.
- (14) No. Cu. Yds. Concrete - 230 cu. yds.
- (15) Sq. Roofing - 17.54 sqs. Asphalt shingles
- (16) No. Tons Structural Steel - None
- (17) Bldg. Services & Facilities - Raw water; filtered water; steam; steam heat; air; sanitary sewers; plumbing and drainage; lighting 110 V, A.C., 60 C; power 440 V, 3 P, 60 C; and telephone.
- (18) Additions & Changes - Added: 25' 0" section to east end of building and additional equipment.

- (19) Major Bldg. Equipment - Start up date for #1 and #2 Filters
- July 19, 1943; start up date for #3 and #4 Filters
- approximately September 15, 1943.

The following list of filter equipment was furnished by and erected under the supervision of the Roberts Filter Manufacturing Company:

Original filter equipment installed to supply a capacity of 300 G.P.M. filtered water.

2-8' 0" I.D. x 9' 0" wood tank gravity filters.

1 wood settling tank 24' 6" I.D. x 12' 0".

1 wood mixing tank 9' 8" I.D. x 12' 0".

1 wood clear water storage tank 40' 0" I.D. x 12' 0" with wood cover.

1 mechanical agitator with 2 H.P. electric motor.

Chemical feeding equipment for sulphate of alum, consisting of a wood mixing tank 5' 6" I.D. x 3' 9" and wood feeding tank 6' 0" I.D. x 3' 6".

Chemical feeding equipment for soda ash consisting of a chemical mixing tank 4' 0" I.D. x 3' 0" and steel feeding tank 4' 6" I.D. x 2' 9".

1 platform scale.

1 centrifugal backwash pump, 760 gal. per minute with 10 H.P. motor.

Chlorine feeding equipment.

Miscellaneous piping valves and instruments.

Additional filter plant equipment added to increase capacity of filter plant to 400 gallons per minute:

2-8' 0" in diameter wood tank gravity filters.

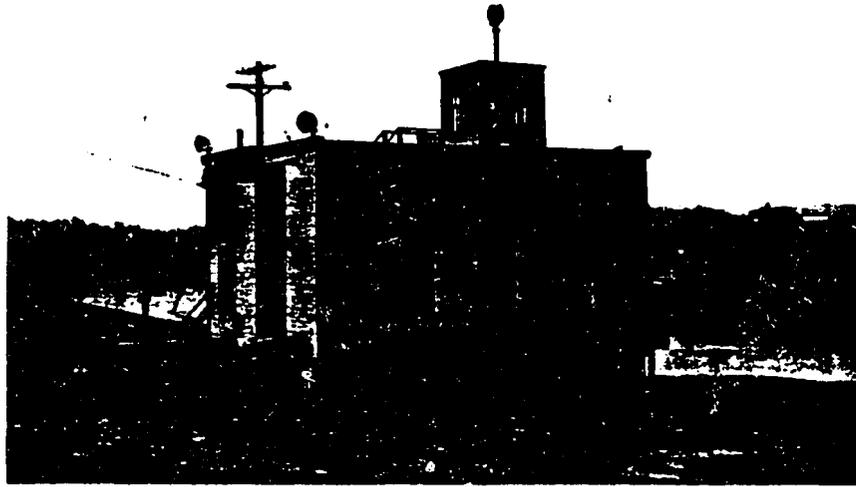
1 wood settling tank 24' 6" I.D. x 12' 0".

1 wood mixing tank 9' 8" I.D. x 12' 0".

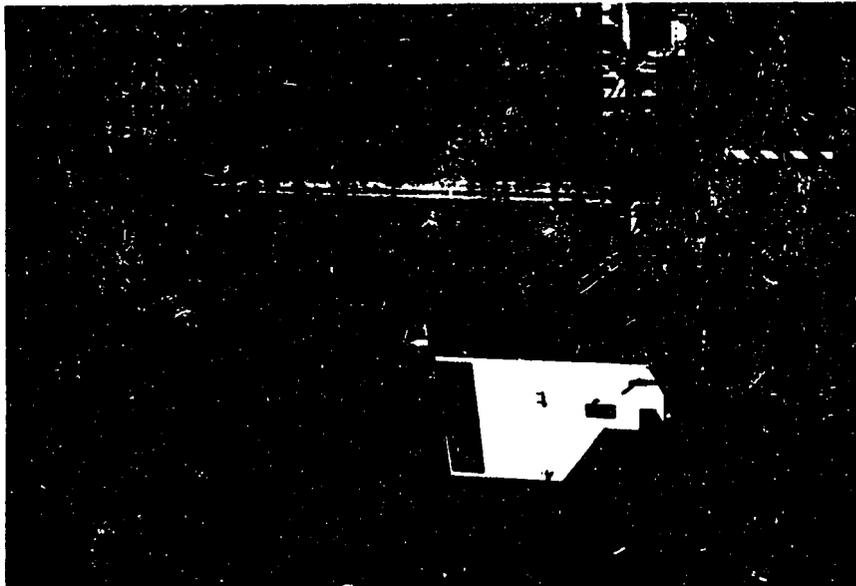
1 mechanical agitator for mixing tank.

1 rectangular wood chemical distribution box.

Miscellaneous piping valves and meters.



River Pump House - Bldg. 214
Looking East
Project 9788
Clinton Engineer Works
Roll 29 Date 6-10-48



Boiler House - Bldg. 211
Looking Northwest
Project 9788
Clinton Engineer Works
Roll 29-7 Date 6-15-48

~~SECRET~~

SUMMARY BUILDING DATA

- (1) Building No. - 814
- (2) Name - RIVER PUMP HOUSE BUILDING
- (3) Date Construction Started - April 5, 1943
- (4) Date Start Up - July 15, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES - December 15, 1943
- (6) Date Construction Completed - August 27, 1943
- (7) Date Accepted by Government - December 17, 1943
- (8) Type of Construction - 2 story wood frame structure with reinforced concrete substructure intake weir and clearwell. Substructure is composed of reinforced concrete floor slab footing, reinforced concrete gravity walls, and reinforced concrete roof slab. Superstructure is of wood frame with flat built-up roof covered with 1" decking, sheathing and drop siding with building paper insulation between siding and decking. Office is lined with rock board and balsam wool insulation. Starter room is lined with rock board adjacent to the office partition. Second story portion of substructure is a flat roof guard tower with an outside wooden stairway.
- (9) Dimensions - Substructure: Clearwell--bottom 31' 6" x 14' 0" O.D., 27' 6" x 10' 0" I.D.; top 29' 6" x 10' 0" deep.
Intake weir: bottom 9' 0" x 17' 4" O.D., 5' 0" x 17' 4" I.D.; top 7' 8" x 15' 0" I.D.; 19' 0" x 29' 0" high; minimum depth 17' 6"; maximum depth 23' 0".
Pump Floor Slab: 31' 6" x 23' 8", 1' 6" thick.
Superstructure: 31' 6" x 9' 0", 16' 8" high, 16' 2" ceiling.
Guard Tower: 7' 6" x 7' 6", 9' 0" high.
- (10) Total Volume - 23,500 cu. ft.
- (11) Sq. Ft. Floor & Type - 700 sq. ft. concrete 4" thick, 31 sq. ft. 1" T & G flooring.
- (12) No. Rooms - 4 - Clearwell and Intake Weir, Office, Guard Tower, Motor Control Room.
- (13) No. Board Ft. Lumber - 7,000 bd. ft. total - 3000 bd. ft. siding, decking and sheathing; 4000 bd. ft. frame; 350 bd. ft. 1/2" rock board; 700 sq. ft. 1" balsam wool insulation.
- (14) No. Cu. Yds. Concrete - 336 cu. yds.

- ~~SECRET~~
- (15) Sq. Roofing - 9.8 sqs. Built-Up Roofing.
 - (16) No. Tons Structural Steel - None
 - (17) Bldg. Services & Facilities - Raw water; lighting 110 V, A.C., 60 C; electric space heaters; search lights; power 2200 V, 3 P, 60 C; and telephones.
 - (18) Additions & Changes - Covered mono-rail framework over pump suction area with 1" T & G sheeting and drop siding, and installed additional electric space heater.
 - (19) Major Bldg. Equipment - Start up date for #1 and #2 pumps - July 13, 1943; start up date for #3 pump - September 8, 1943.

The major equipment for this building was as follows:

3 Layne Deep-Well Turbine Pumps, 1000 G.P.M. against 250 ft. head.

3-75 H.P. 2200 V, 3 P, 60 C Vertical Hollow Shaft Motors.

3 Rowan Cubicles.

Gate valves, check valves, trash rack, gauges, etc.

SUMMARY BUILDING DATA

- (1) Building No. - 815
- (2) Name - OVERHEAD WATER STORAGE TANK
- (3) Date Construction Started - May 5, 1943
- (4) Date Start Up - July 17, 1943
- (5) Date Acceptance Approved by CLINTON LABORATORIES -
December 6, 1943
- (6) Date Construction Completed - October 12, 1943
- (7) Date Accepted by Government - December 9, 1943
- (8) Type of Construction - Three panel hemispherical bottom,
elevated steel storage tank with conical top, three
section box channel column tower and 36" steel riser,
reinforced concrete batter pier foundation with spread
footings and reinforced concrete valve pit.
- (9) Capacity - 50,000 gallons.
- (10) Dimensions - Tank 19' 1 1/8" I.D., 32' 10 3/8" high, 1/2"
steel plate sides and bottom, 3/16" steel plate top,
bottom of tank 100' above ground.

Tower 106' 0" high, base 31' sq., top 20' 1 1/8"
sq., 36" O.D. steel riser, 100' high.
- (11) No. Cu. Yds. Concrete - 84 cu. yds.
- (12) No. Tons Structural Steel - 43.9 tons.
- (13) No. Board Ft. Lumber - None
- (14) Bldg. Services & Facilities - Raw water; steam; flood-
lighting 110 V, A.C., 60 C.
- (15) Additions & Changes - Added: Revolving Ladder, Weather
Vane, Thermohm Mast and Thermohm Boxes.
- (16) Major Bldg. Equipment - Entire structure.



**Overhead Water Storage Tank - Bldg. 818
Locking East
Project 9783
Clinton Engineer Works
Roll 44-16 Date 7-14-45**



**Filter Plant - Bldg. 818
Locking Southeast
Project 9783
Clinton Engineer Works
Roll 121-8 Date 11-11-45**

VIII PLANNING AND SCHEDULING

A Organization and Duties

The personnel of the Planning and Scheduling Department was kept to a minimum and some of the work carried on by the Department on other projects was streamlined or eliminated. The organization at its peak consisted of a Planning and Scheduling Engineer, Assistant Planning and Scheduling Engineer, a Draftsman, two stenographers and a clerk. The supervision in this Department was familiar with du Font Planning and Scheduling procedures.

The principal duties consisted of:

1. The coordination of the Scheduling efforts of the Division Engineers, Craft Superintendents, and management.
2. The compilation and issuance of standard reports required by the Government and the Company.
3. The handling of Building Acceptance between the Government, Clinton Laboratories, and the Company.
4. The preparation of special assigned reports for the Government and Management.

Through the periodic issuance of schedules, charts, and reports, the Field and Management were kept advised of the current status of construction.

The duties of the Department are discussed in the following paragraphs.

B Scheduling

1. Construction Schedules

During the initial period of construction, the Planning and Scheduling Engineer met with the Division Engineers and Management and with the information contained in the Design Schedule and the Material and Equipment List furnished the Project by Design Division, a preliminary Master Construction Schedule was prepared which was coordinated with the design release and equipment promised delivery dates.

Emphasis was placed upon the completion of all Temporary Construction during the early stages of the Project. Upon completion of this phase, it was planned to give the Service Areas priority on labor in order to advance construction in these areas as far as possible before the release of design for the process areas. Upon the release of design for the Process Areas, the bulk of labor was to be transferred to these areas.

Photostats of the preliminary construction schedules for this project appear on Pages 432 through 434.

CONSTRUCT
CONSTRUCT
PROJEC

PLANT: C. S. V.

BLDG NO.	DESCRIPTION		JAN. 1/15/2025	FEB. 2/15/2025	MAR. 3/15/2025	APR. 4/15/2025	MAY 5/15/2025	JUNE 6/15/2025	JULY 7/15/2025	AUG. 8/15/2025	SEPT. 9/15/2025
101	PROCESS BLDG.	Design Const.							Const. delayed to starting date shown		
		Procure Install									
105	PROCESS BLDG.	Design Const.			Insufficient information to schedule						
		Procure Install			Insufficient information to schedule						
115	PROCESS BLDG.	Design Const.									
		Procure Install									
205	PROCESS BLDG.	Design Const.									
		Procure Install									
206	PROCESS BLDG.	Design Const.							Based on completion of Unit 10		
		Procure Install							See note on construction above		
501	XLNO. HWY. STA. & O.B. WIRING	Design Const.									
603	ROADS & VALES	Design Const.							Revisions and additions being made with subsequent		
605	FENCES	Design Const.							Revisions and additions being made with subsequent		
614	GUARD TOWERS	Design Const.									
615	FENCE LIGHTING	Design Const.									
622	OVERHEAD STRAM	Design Const.									
623	UNDERGROUND WATER	Design Const.									
624	AIR LINES	Design Const.									

UNIT. START/STOP DATE
SEE ON U/10/10/10 BY T. L. BIRDS
UNIT. COMPLETION DATE

ION DIVISION

ON SCHEDULE

NO. 9733

PRELIMINARY

DATE - 3/12/43

5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025	5/15/2025
due to change in location of bldg. & re-design of foundation.															
ok - 14 wks. incl. matl. del. & construction															
at issue.															
rent issues.															

BLDG. NO.	DESCRIPTION	Design Const.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY
			1 10 19 2025	1 10 5 2025	1 10 9 2025	1 10 5 20	1 10 5 2025	1 10 5 2025	1 10 5 2
625	SEWER & SEPTIC TANKS	Design Const.		No information from Des			ign to date		
628	PROCESS LINES	Design Const.		No information from Des			ign to date		
630	FIRE PROTECTION	Design Const.							
701	GATEHOUSE & CLOCK ALLEY	Design Const.							
702	TELEPHONE SYSTEM	Design Const.		No Scheduled Issue Date					
703	MAIN OFFICE BLDG.	Design Const.							
707	CHANGE HO. BLDG. "A" & "B"	Design Const.							
708	CATERERIA	Design Const.							
717	SEED & SUPPLY STORAGE	Design Const.							
719	FIRST AID & SERVICE	Design Const.		Change in Design - No S			Scheduled Issue Date		
728	DAB STATION BLDG.	Design Const.							
725	PARKING GARAGE BLDG.	Design Const.							
733	COMBINED WITH 719								

733

CONSTRUCT
CONSTRUCT
PROJECT

PLANT - C. E. W.

G.	DESCRIPTION		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
			5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25
	BOILER HOUSE BLDG.	Design									
		Const.									
		Procure									
	EQUIPMENT	Const.									
		Design									
	RESERVOIR BLDG.	Const.									
		Design									
		Const.									
	PUMP HOUSE	Design									
		Const.									
		Procure									
		Const.									
	FILTER PLANT BLDG.	Design									
		Const.									
		Procure									
		Const.									
	RIVER PUMP HOUSE BLDG.	Design									
		Const.									
		Procure									
		Const.									
	EQUIPMENT	Const.									

Based on 3AA

START DATE
 END DATE
 INT. COMPLETION

SCHEDULE

9733

ORIO. 6-1-43
DATE - REV. 9-27-43

2

DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25	5 10 5 20 25
[Empty grid cells for scheduling data]																								

77 100

PLETION DATE

7. 1943

1000

100

100

ACT. START-UP

NOTE: THE COMPLETION DATES SHOWN ON THESE SCHEDULES ARE FOR THE SUBSTANTIAL COMPLETION OF THE BUILDINGS AND AREAS.

CONSTRUCT
CONSTRUCT
PRO.

PLANT - CLINTON ENGINEER WORKS

BLDG. NO.	DESCRIPTION	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
		5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25
	700 AREA									
701A	GATE HOUSE AND CLOCK ALLY		70	75	80	85	90	95	100	
701B	GATE HOUSE			80	85	90	95	100		
702	TELEPHONE SYSTEM			85	90	95	100			
703	MATH OFFICE BUILDING		85	90	95	100				
706A	LABORATORY				90	95	100			
706AA	LABORATORY					95	100			
706B	LABORATORY					100				
706AB	MANIFOLD HOUSE									
707A	CHANGE HOUSE BUILDING			85	90	95	100			
707B	CHANGE HOUSE BUILDING			85	90	95	100			
708	CAFETERIA			85	90	95	100			
713	GENERAL STOREHOUSE									
714	STORAGE PLATFORM									
715	FLAG POLE									
717A	SHOP & SUPPLY STORAGE			85	90	95	100			
717B	SHOP & SUPPLY STORAGE			85	90	95	100			
719	FIRST AID HOUSE BUILDING			85	90	95	100			
720	PATROL HEADQUARTERS BUILDING									
724	GAS STATION BUILDING									
725	PARKING GARAGE BUILDING			85	90	95	100			
726	PROPANE STORAGE TANKS & OSL									
735	TRAINING SCHOOL									
737	RAIN SHELTERS									

DATE SET BY T. L. PIERCE ON 1-12-54

CONST
CONST

PLANT: CLINTON ENGINEER WORKS

BLDG. NO.	DESCRIPTION	DEC.	JAN.	FEB.	MAR.	APR.			
		5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25
603	ROAD ADDITIONS			100					
622	STEAM LINES ADDITION			30	100				
623	UNDERGROUND WATER ADDITION	5	97	100					
624	AIR LINES ADDITION			30	100				
625	SEWER ADDITION			39	100				
628	PROCESS ADDITION	12	92	100					
630	FIRE PROTECTION LINES ADDT.			48	100				
631	OVERHEAD PIPE SUPPORTS ADDT.			94	100				
701A	CLOCK ALLEY & GATE HOUSE		100						
706A	LABORATORY ADDITION			69	100				
706C	HOT LABORATORY		5	54	97				
707B	CHANGE HOUSE ADDITION		17	100					
707C	CHANGE HOUSE		25	88					
708	CAFETERIA ADDITION			59	85				
717B	SHOP & SUPPLY HOUSE ADDITION		62	84	100				
723	LAUNDRY			22	100				
726	PROPANE GAS LINES ADDITION			58	100				

CANT. START OF REPORTING DATE

RESEARCH DIVISION

RESEARCH SCHEDULE

PROJECT NO. — 58 —

DATE - REV. 0-27-43

REV. 2-1-44

NOV. 5 10 15 20 25	DEC. 5 10 15 20 25	JAN. 5 10 15 20 25	FEB. 5 10 15 20 25	MAR. 5 10 15 20 25	APR. 5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25	5 10 15 20 25
EXPERIMENTAL CHANGES														
EXPERIMENTS														
ADDITIONAL EXPERIMENTS														
SCHEDULE START-UP & COMPLETION DATE														

Another Construction schedule made June 1, 1943, and revised on September 27, 1943, is shown on Pages 435 through 438. A construction schedule was prepared on January 3, 1944, for the additional authorized work which was started on December 11, 1943. The Construction schedule for Project 25, revised on September 27, 1943, and further revised on February 1, 1944, appears on Page 440.

Detailed building schedules were made for all main process buildings in accordance with the overall Master Construction Schedules and were revised periodically and maintained current with the changing conditions in material and labor. These were prepared on the basis of detailed items of work and were made for the use of the Field and Management.

Immediately prior to the scheduled start up of the Process Buildings, it was necessary to closely plan the work so that each job could be performed as soon as possible after the receipt of equipment. A detailed schedule was prepared for the installation of materials and equipment received after start-up and to be installed during a scheduled shut-down period.

A further discussion of the Construction Schedules is included in Part V, Section "C", Progress of Construction.

2. Weekly Work Schedules

In order to coordinate and control the sequence of work, and to assure an economical job, weekly construction schedules were prepared and work forecast in accordance with the Master Construction Schedules. Due to the limited number of qualified personnel of the Department, job analyses, sequence charts, and craft labor estimates were not made. The department could be classified as a centralized organization as it did not maintain personnel at the offices of the Craft Superintendents and the Division Engineers. Each week the Division Engineers prepared an itemized forecast of the work which should be accomplished during the following week in order to equal or better the Master Schedules, giving consideration to material & equipment deliveries. These forecasts were submitted to the Planning and Scheduling Field Engineer, who compiled the work items by crafts. The work forecasts separated by crafts were then submitted to the Craft Superintendents concerned. When the Craft Superintendents completed his analysis of the work forecast, he returned it to the Field Planning and Scheduling Engineer indicating the number of men required for each item of work to complete on the specified time. This information was again reassembled by buildings or structures and presented a complete overall picture of the construction work to be done in each building or structure during the forecast period.

A weekly meeting was held, attended by the Field Superintendent, Craft Superintendents, Division Engineers, Assistant Planning and Scheduling Engineer, Planning and Scheduling Field

Engineer, and other interested individuals at which time the forecast was reviewed and any final corrections made. Copies of the work forecast, after being finally approved were then distributed to Management and to the field as a "Restricted" document.

A Foreman's Daily Work Report was submitted daily by each gang foreman showing the work done and the number of men on roll and working. Periodic field checks were made by the Planning and Scheduling Field Engineer which served as a check against the Foreman Daily Work Reports and the weekly schedules. From this information, a craft summary was prepared which indicated the actual performance of each craft in man days, the percentage of performance, number of men on roll, number working, and the work scheduled per craft.

The work schedules gave an indication as to whether sufficient personnel was employed. During the expansion period, it was indicated that insufficient personnel was available as it was necessary to schedule more men than were on roll in order to meet the scheduled completion dates. During the period when the trend of the forces was downward, an excess of personnel was indicated by the fact that all the employees on roll could not be scheduled to work on the jobs forecast and steps were taken at once to correct this situation.

3. Critical Order Charts

Critical Order Charts for the 100, 200, and 300 Areas were prepared by the Department, information for which was obtained from the Expediting Department. The number of critical orders was determined by limiting the orders to those required for start-up and whose promised shipping dates were not satisfactory. These charts are discussed further under Part V, Section "C", Progress of Construction.

4. Design Expediting

Design Expediting was assigned to this department as one of the routine duties. The department maintained a current design schedule which gave data on the scheduled issue dates of drawings. It was necessary to contact the Wilmington Office on delinquent drawings when such design tended to hold up construction progress. The department further expedited the issuance of drawings when it was necessary to obtain certain design prior to that scheduled in order to prevent any delay in construction. All design expediting was done through the Control Engineer although other requests pertinent to design were requested directly.

C Standard Reports

1. Construction Progress Report

The Construction Progress Report was issued weekly to the

Construction Division, Explosives Department, Design Division, U. S. Government, all at Wilmington, Delaware; to U. S. Government, Local; and to Local or Construction Division. The report gave the physical completion of the work as of Saturday. The information carried in this report consisted of the physical percent completion of each project as a whole as well as by Areas, Buildings, and Services. The estimated or actual completion date of each structure was shown, the percent completion of units at the end of the previous period, and its present status was indicated.

The structure items were divided into the major divisions of "Buildings" and "Equipment." The "Building" division was subdivided as to foundation, superstructure, and services. The "Equipment" item was subdivided as to foundation, equipment installation, electrical and piping. Each phase of the work was weighted in order to determine, in a consistent and uniform manner, the physical percent completion of the structure. Each structure of an Area was weighted to obtain the overall area physical percent completion. The areas were further weighted in order to obtain the overall Project status.

Other data included in this report were such items of interest as start-up dates, building acceptance dates, and other pertinent information.

A current report on Safety was included giving the minor injury frequency rate for the period, the major injury frequency rate, major injury severity rate, the number of major injuries, and the total exposure hours since the last major injury.

Weather data was included as obtained from the weather Bureau located at the Knoxville Municipal Airport, located approximately thirty-five miles distant from the construction site. Information furnished included the type of day, precipitation, and the maximum and minimum daily temperature.

Information on force was also included tabulating the number of employees on the following payrolls: du Pont local salary, Wilmington salary, Cost-Plus-A-Fixed-Fee Subcontractors', and U. S. Government. The total number of employees on all payrolls during the previous period was also shown.

The names of all Company and Army visitors not directly connected with the Project were included in the report.

2. Composite Chart

A composite chart was prepared and issued monthly to the Wilmington Office. It illustrated in graphical form the daily du Pont and Cost-Plus-A-Fixed-Fee subcontractors' forces, the rate of minor injuries per 10,000 man hours, the du Pont daily and accumulated payroll, and the gross sum spent. A photostat

of the composite chart for these projects is shown on Page 445.

3. Concrete Pouring Chart

A concrete pouring chart was issued monthly to the Wilmington Office showing the daily and the accumulated cubic yards of concrete poured. This chart covered the concrete used for general structural purposes and was known as Class "A" Concrete which had a specified 28 day compressive strength of 2,500 pounds per square inch. The final pour of this material was made on March 1, 1944. The daily and accumulative pours are shown graphically on Page 446.

A special type of concrete made with Barytes aggregate and Haydite Sand was used in a portion of the 105 Building (See Part VII, Section K). This concrete was known as Class "B" Concrete and no 28 day compressive strength was stipulated. This special concrete was used where called for by Design in order to permit satisfactory operating conditions for a production process phase of classified category. The final pour was made on August 21, 1943. This type of concrete was the only concrete that was batched on this plant site. A concrete batching plant was rented for this purpose. A graph appears on Page 447, showing the daily and accumulative concrete pours for this special material.

4. Major Construction Equipment Report

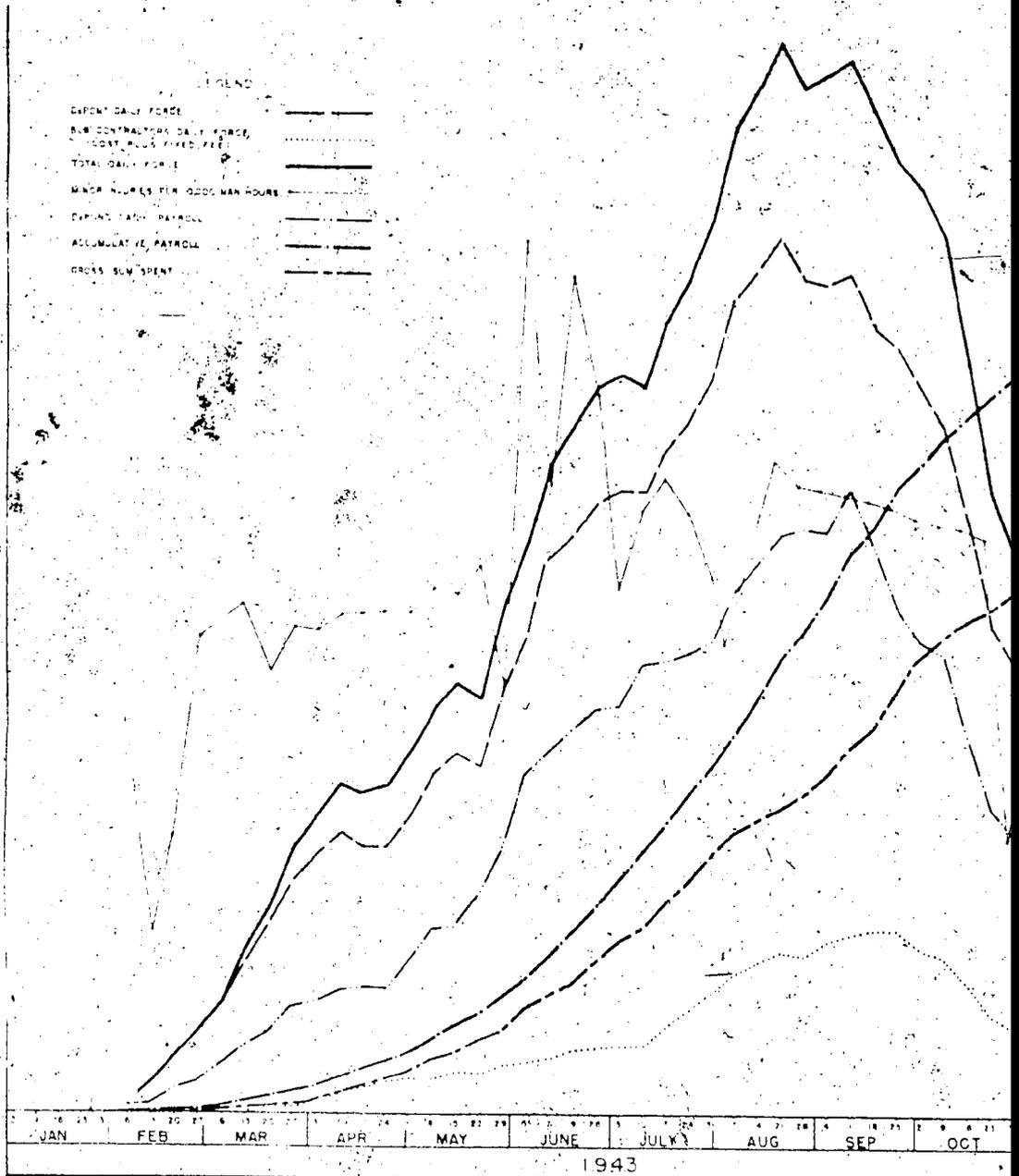
Major Construction Equipment Charts were prepared and issued monthly to the Wilmington Office. The equipment for which the charts were prepared included Air Compressors, Bulldozers, Cranes, Dump Trucks, Flat Trucks, and Welding Machines. The charts show graphically the number of pieces of equipment on the Project, the available hours based on a single day shift, and the hours in shop during the weekly period. The charts did not reflect the usage of the equipment on the second shift of construction or operating time over the basic work week. The charts reflected the changes in the work week hours as indicated on the photostats appearing on Pages 448 through 453.

5. Government Field Progress Report

The Government Field Progress Report was prepared for the Corps of Engineers in accordance with their request of February 25, 1943. This report was issued monthly. File copies were forwarded to the Wilmington Office and one copy was maintained in Central Files on the Plant Site. The scope of information contained in this report was in considerable more detail than that included in the Company's Construction Progress Report. The report was subdivided as follows:

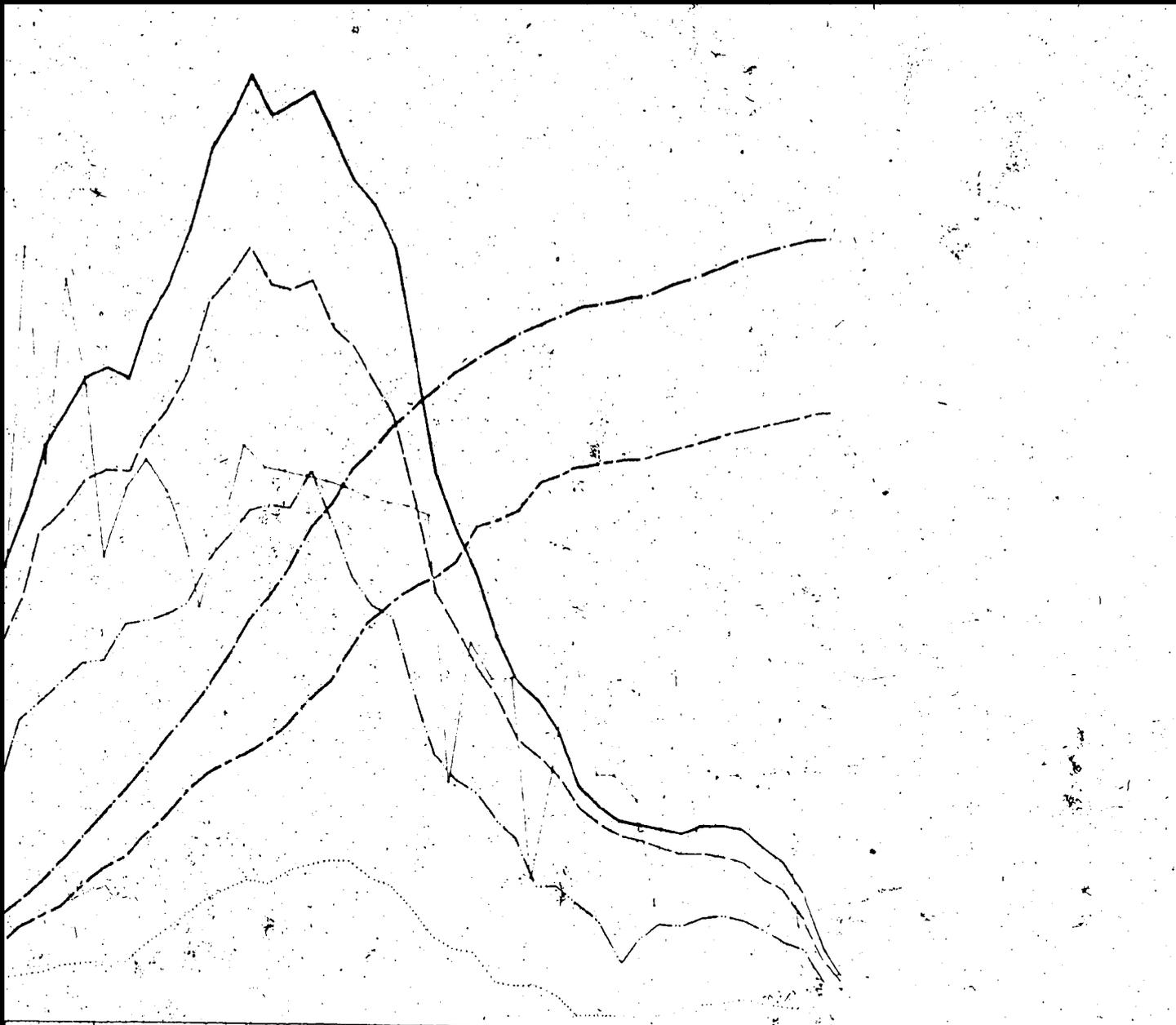
Part "A" included a description of construction and a working estimate of cost.

Part "B" gave the status of Project units. The estimated cost of each structure was shown as well as the construction



COMPOSITE CHART
 CLINTON ENGINEER WORKS
 PROJECT - 9733 B 58

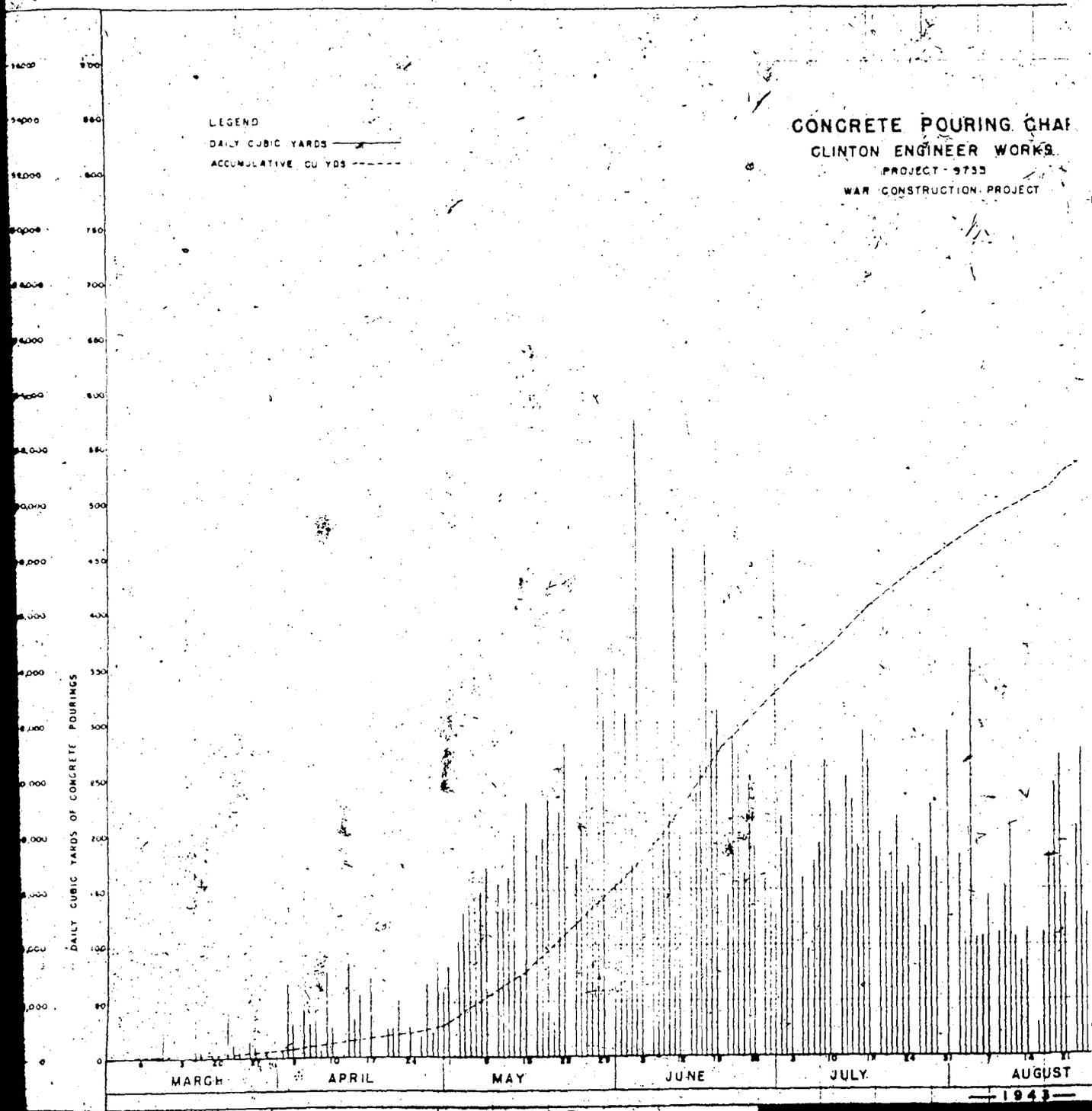
445

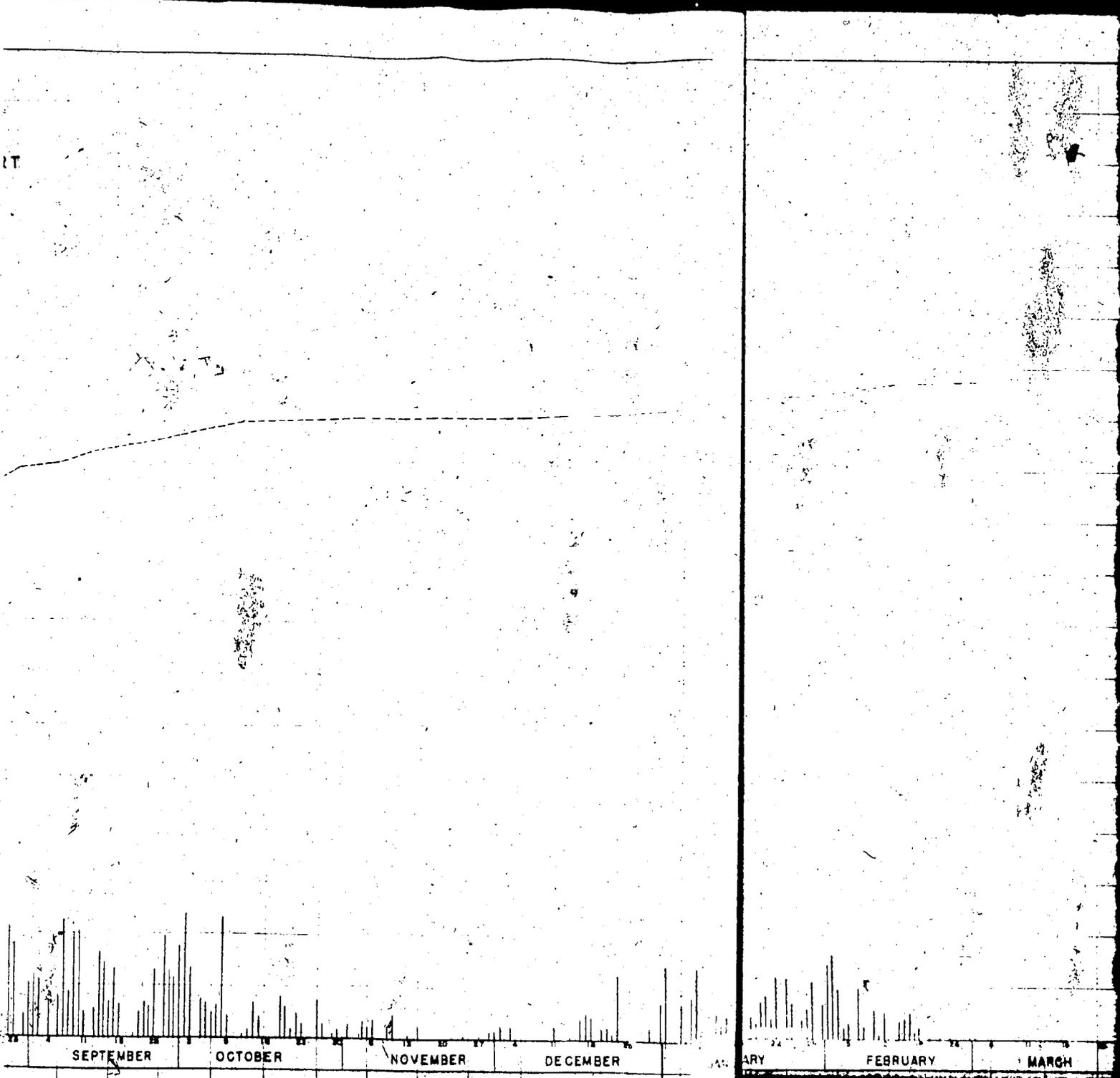


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																																																																																																			
JUNE 1943										JULY										AUG										SEP										OCT										NOV										DEC										JAN										FEB										MAR										APR										MAY										JUNE 1944									

COMPOSITE CHART
 CLINTON ENGINEER WORKS
 PROJECT - 97.33' B .58

445



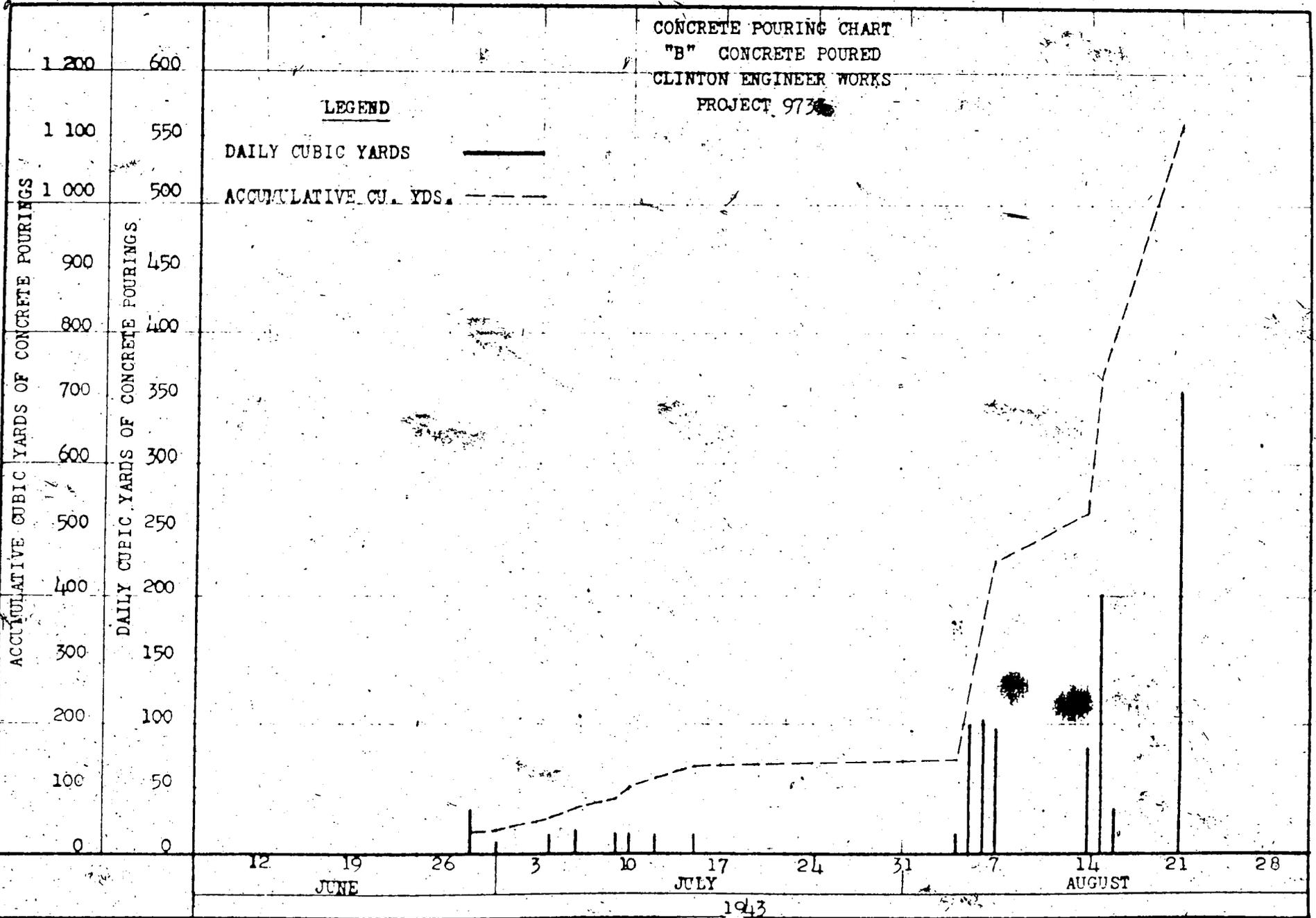


CONCRETE POURING CHART
 "B" CONCRETE POURED
 CLINTON ENGINEER WORKS
 PROJECT 9736

LEGEND

DAILY CUBIC YARDS ———

ACCUMULATIVE CU. YDS. - - - -

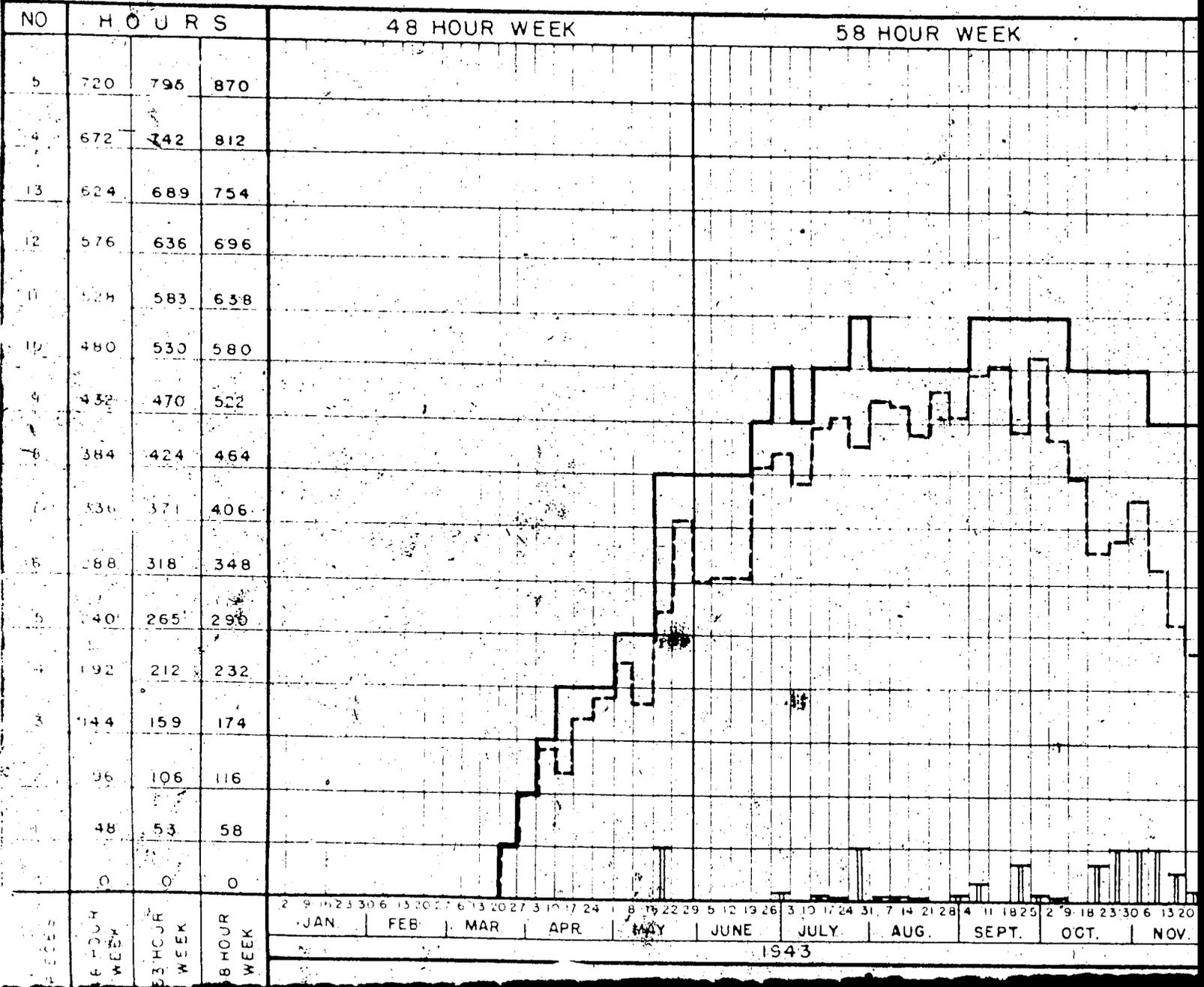


-447-

1943

LEGEND		
—	AVAILABLE HOURS	
- - -	ACTUAL HOURS	
	HOURS IN SHOP	

WAR CONSTRUCTION DIVISION
 CLINTON ENGINEER WORKS
 PROJECT NO. 9733



CONSTRUCTION DIVISION

ENGINEER WORKS

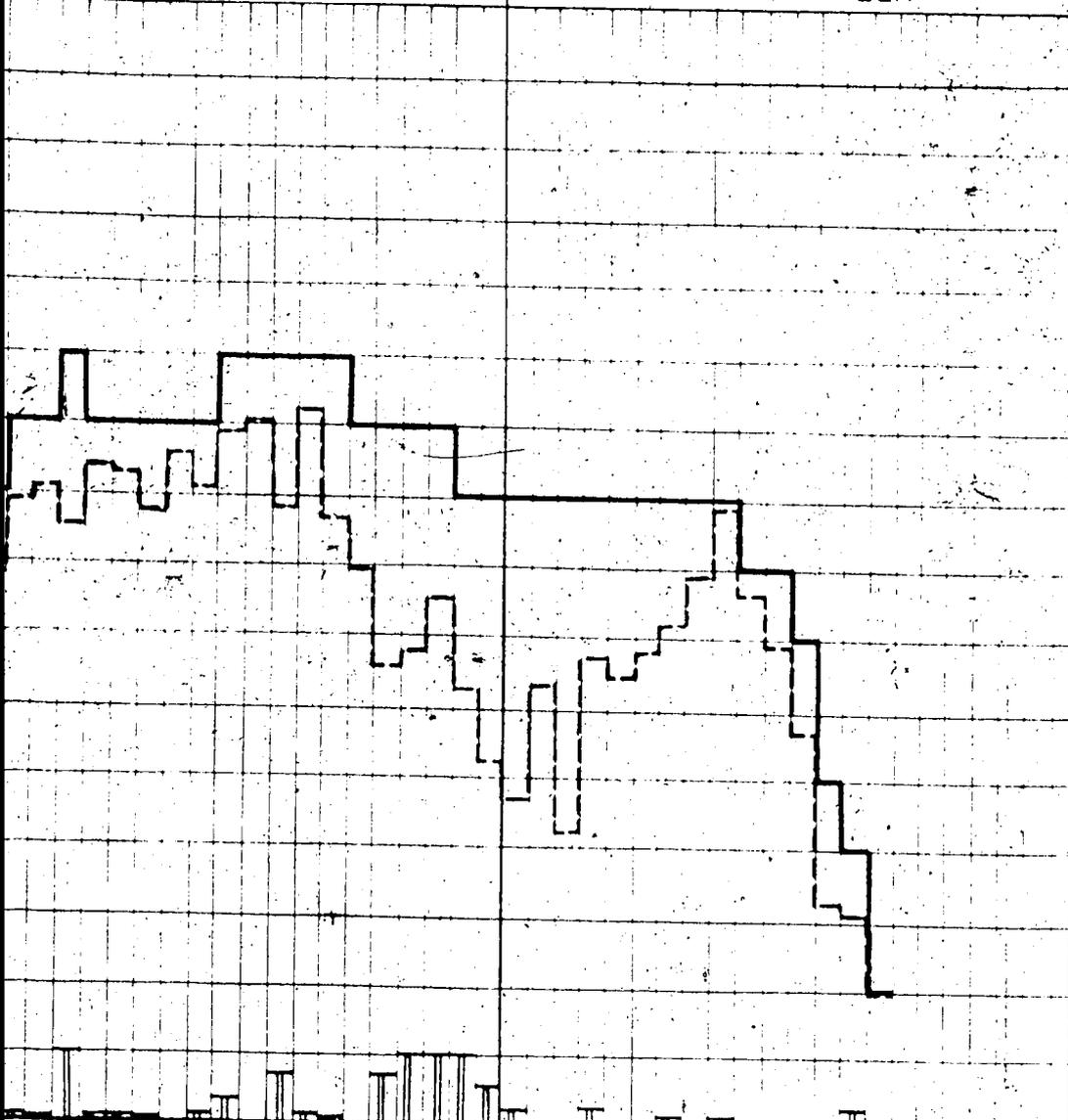
NO. 9733

MAJOR CONSTRUCTION EQUIPMENT CHART

AIR COMPRESSORS

58 HOUR WEEK

53 HOUR WEEK



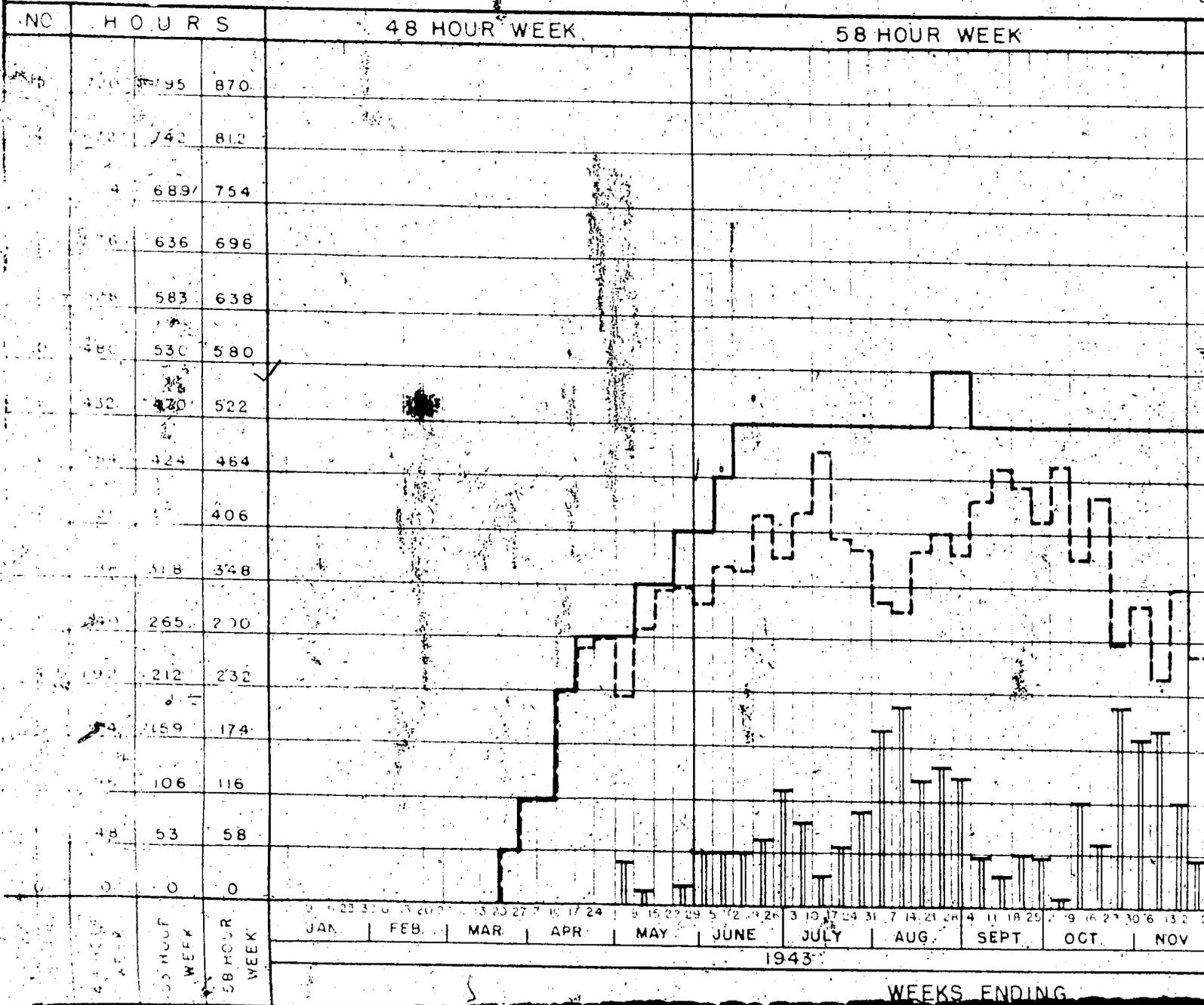
877

17 24 31 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 8 15 22 29 5 12 19 26 4 11 18 25 1944

JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR.

LEGEND	
	AVAILABLE HOURS
	ACTUAL HOURS
	HOURS IN SHOP

WAR CONSTRUCTION DIVISION
 CLINTON ENGINEER WORKS
 PROJECT NO: 9733



LEGEND

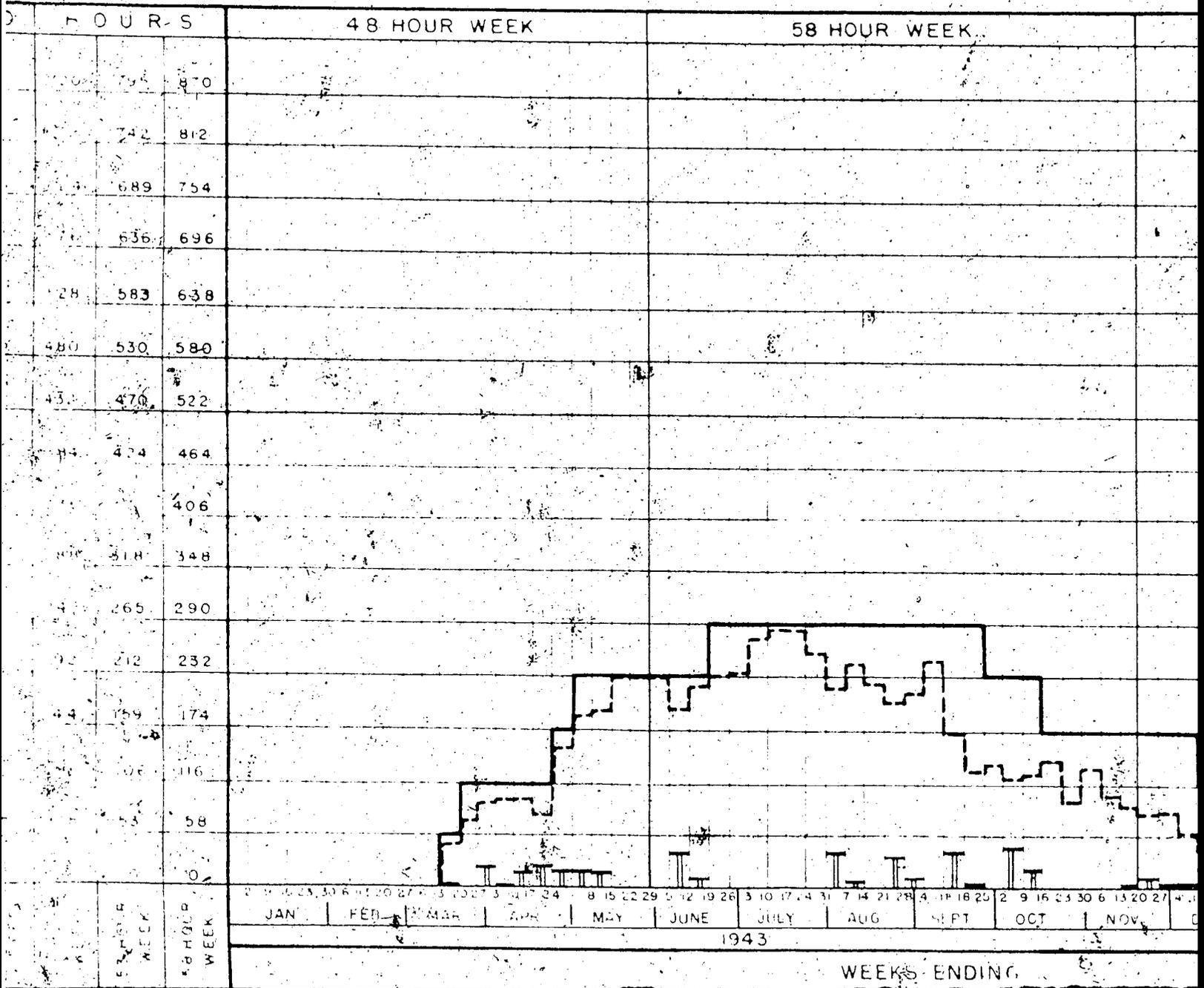
— AVAILABLE HOURS
 - - - ACTUAL HOURS
 ▮ HOURS IN SHOP

WAR CONSTRUCTION DIVISION

CLINTON ENGINEER WORKS

MAJOR

PROJECT NO 9733



LEGEND

— AVAILABLE HOURS
 - - - ACTUAL HOURS
 T HOURS IN SHOP

WAR CONSTRUCTION DIVISION

CLINTON ENGINEER WORKS

PROJECT NO. 9733

MA

NO.	HOURS			48 HOUR WEEK				58 HOUR WEEK			
	48	53	58	1	2	3	4	1	2	3	4
120	795	870									
110	742	812									
100	689	754									
90	636	696									
80	583	638									
70	530	580									
60	470	522									
50	424	464									
40	371	406									
30	318	348									
20	265	290									
10	212	232									
0	144	174									
0	96	106									
0	48	58									
0	0	0									

2 9 16 23 30 6 13 20 27 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20
 JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV.
 1943

WEEKS ENDING

ION DIVISION

ER WORKS

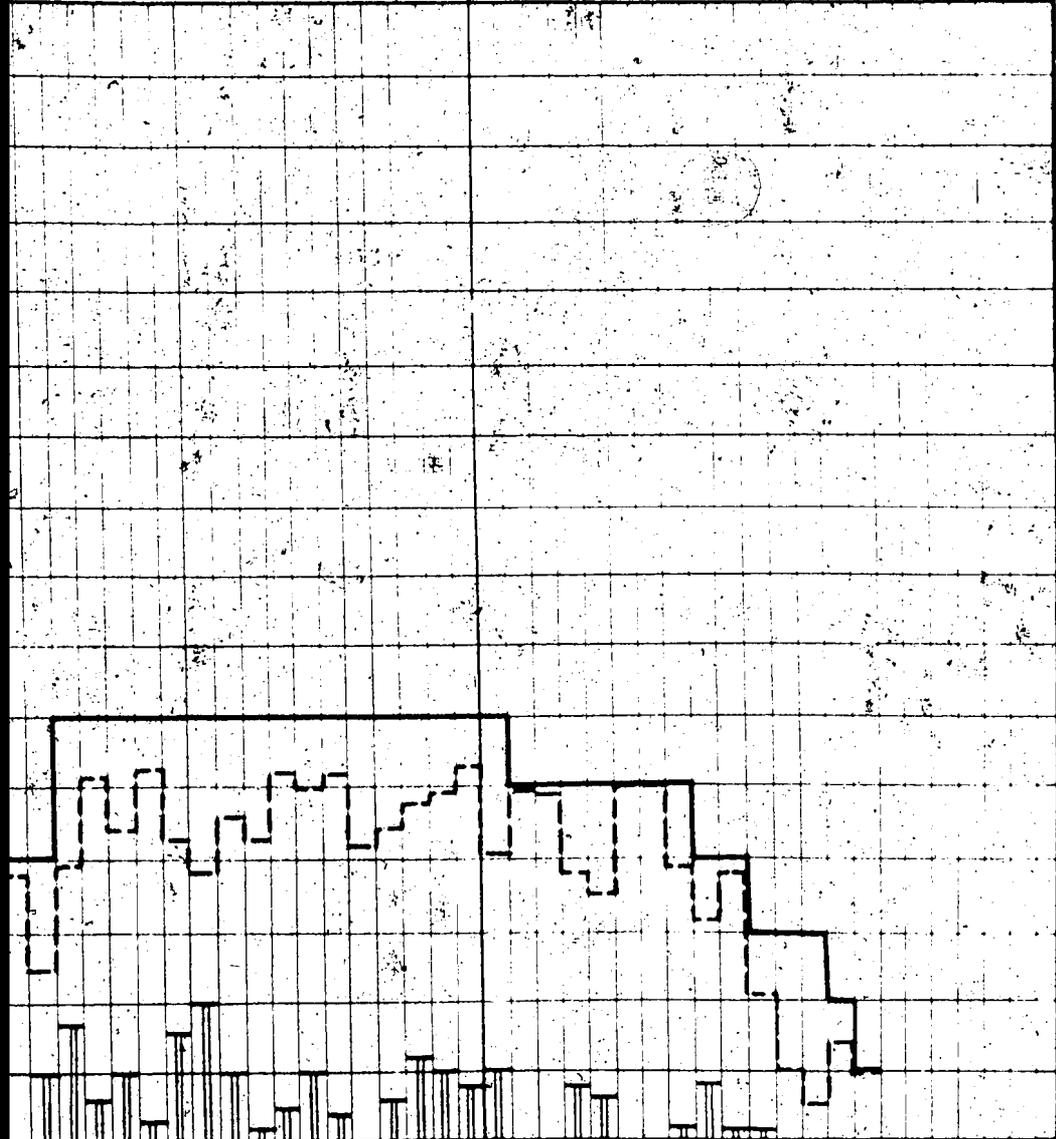
9733

MAJOR CONSTRUCTION EQUIPMENT CHART

DUMP TRUCKS

8-HOUR WEEK

53 HOUR WEEK



24 31 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 8 15 22 29 5 12 19 26 4 11 18 25 5
AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR.

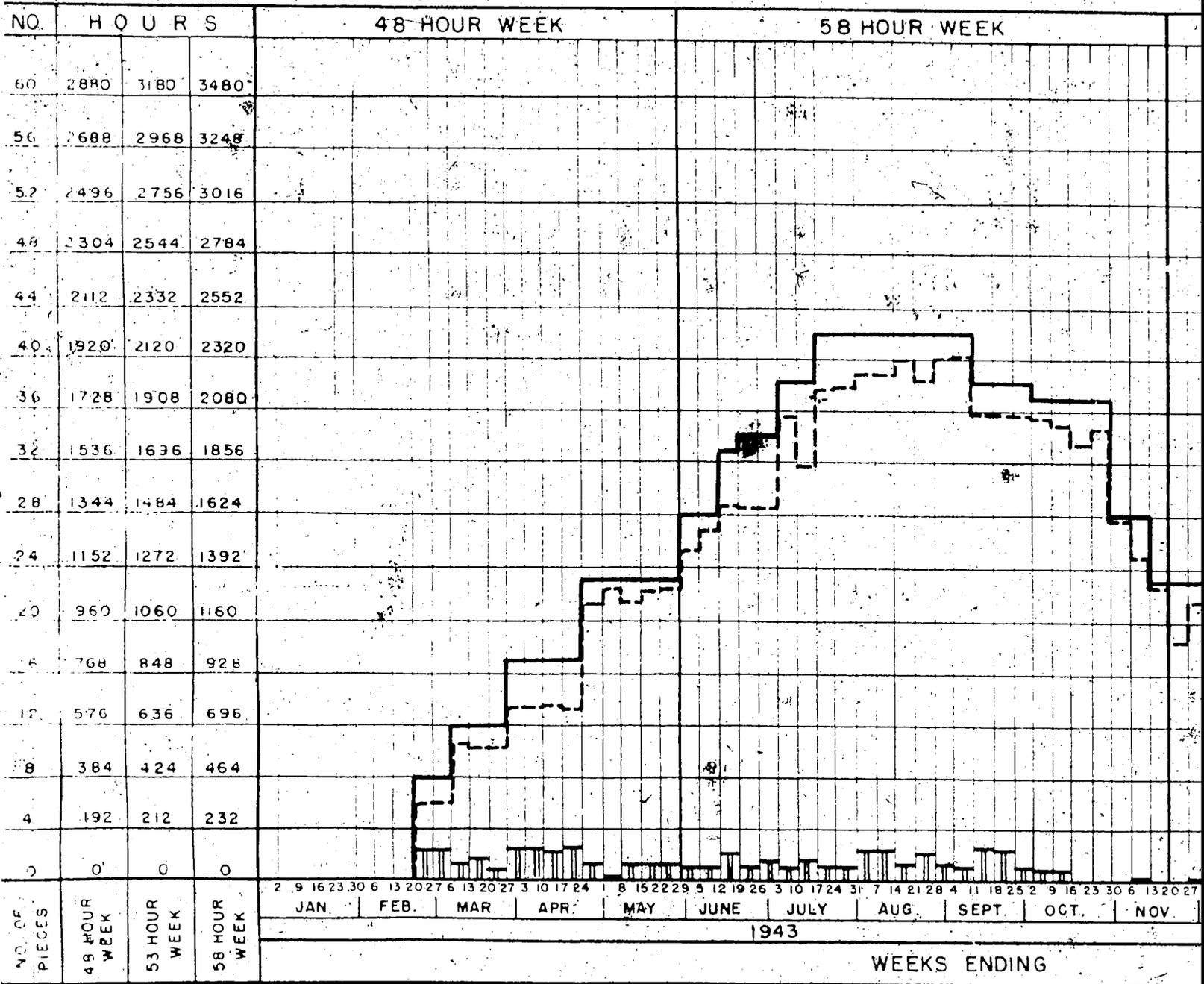
1944

WEEKS ENDING

LEGEND		
—	AVAILABLE HOURS	
- - -	ACTUAL HOURS	
⌈	HOURS IN SHOP	

WAR CONSTRUCTION DIVISION
 CLINTON ENGINEER WORKS
 PROJECT NO. 9733

MA.



CTION DIVISION

NEER WORKS

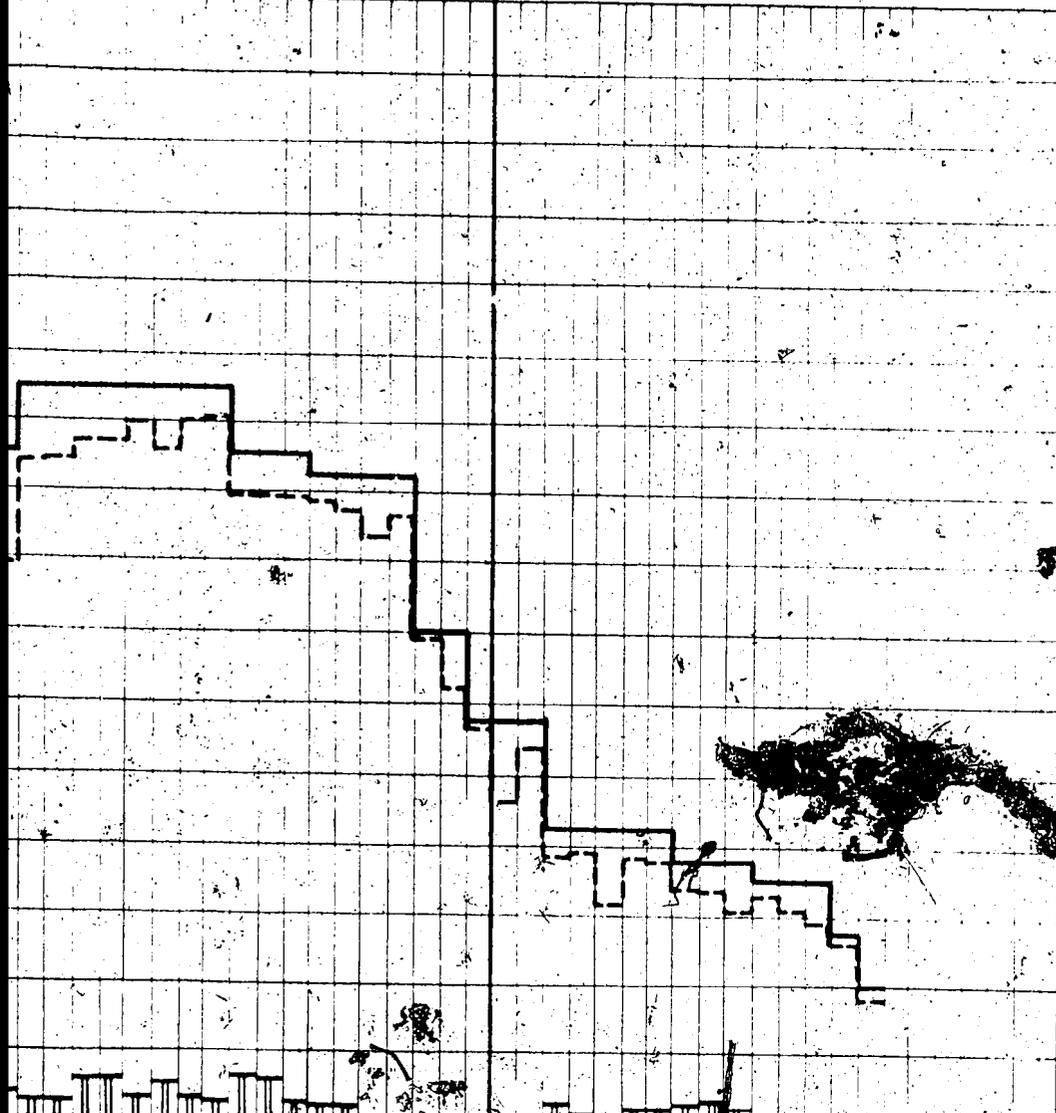
NO 9733

MAJOR CONSTRUCTION EQUIPMENT CHART

FLAT TRUCKS

58 HOUR WEEK

53 HOUR WEEK



17 24 31 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8 15 22 29 5 12 19 26 4 11 18 25 1 8 15

Y | AÜG. | SEPT. | OCT. | NOV. | DEC. | JAN. | FEB. | MAR. | APR.

1944

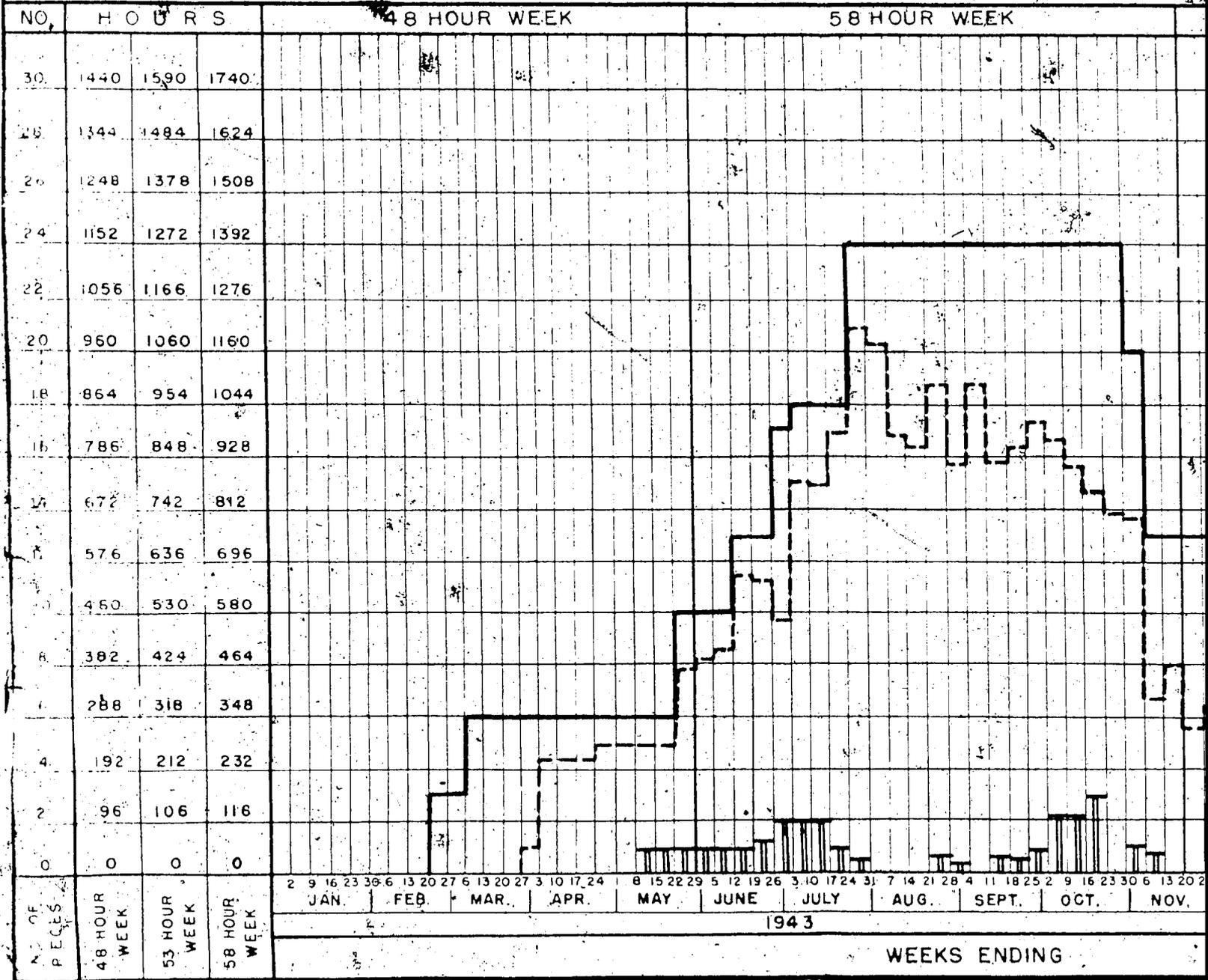
WEEKS

LEGEND

— AVAILABLE HOURS
 - - - ACTUAL HOURS
 T HOURS IN SHOP

WAR CONSTRUCTION DIVISION
 CLINTON ENGINEER WORKS
 PROJECT NO. 9733

MA



CONSTRUCTION DIVISION

ENGINEER WORKS

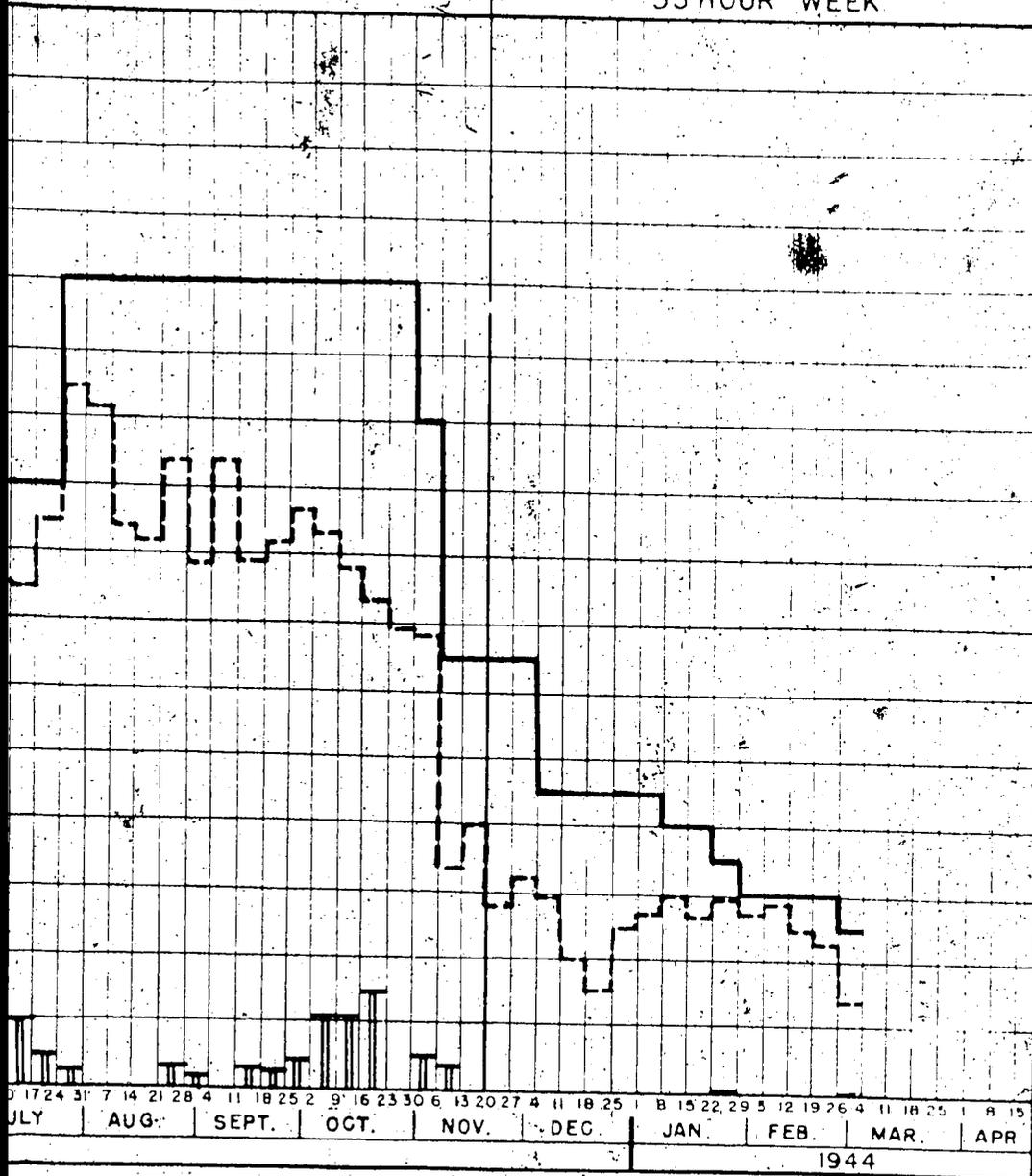
PROJECT NO. 9733

MAJOR CONSTRUCTION EQUIPMENT CHART

WELDING MACHINES (ELECTRIC)

58 HOUR WEEK

53 HOUR WEEK



0 17 24 31 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8 15 22 29 5 12 19 26 4 11 18 25 1 8 15
JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | JAN. | FEB. | MAR. | APR.

1944

WEEKS ENDING

[REDACTED]

status showing the date work was commenced, the percentage completion, and the estimated or actual completion date of the item. Additional information was furnished on the design of the main divisions and included such information as date begun, percentage complete, and the estimated or actual completion date. Information was required on plant equipment such as percent ordered, percent delivered, estimated or actual delivery completion date, and the estimated or actual installation date.

Part "C" contained Progress Graphs of the Project as a whole.

Part "D" of the report related the factors delaying work. Throughout the construction period, the prime factors delaying work were the late delivery of equipment items, the lack of common labor, and the unduly high rate of absenteeism.

Part "E" included information relative to the force as well as a graphical representation of the scheduled, and estimated forces required for the completion of the Project. Part "E" also included an item termed "Availability of Facilities" which expressed graphically the estimated requirements for electric power, water, steam, and sewage treatment as the scope of the Project changed. This part was not required after the close of the period ending October 31, 1943.

Part "F" contained information pertaining to subcontractors.

Part "G" of the report included a general map of the reservation site showing the relative locations of the INX Area and a plot of the construction site showing the location of structures and in code form indicated whether the structure had been started, completed, and whether it was of a temporary nature.

D Building Acceptance

The coordination work of Building Acceptance was handled by the Planning and Scheduling Department.

When a building was substantially completed, the Division Engineer arranged with the Maintenance and Production Area Supervisors of the Clinton Laboratories for a joint inspection of the structure. Upon completion of the inspection, the Division Engineer submitted a Form BA-1, addressed to the Planning and Scheduling Department, giving notification that the structure was complete as of a certain date, except for the items listed on the form for each of which an estimated completion date was indicated. The notice stated the date on which the inspection was made and the names of those who participated.

Upon the receipt of this Notice of Completion of Construction Items, a form BA-2 prepared in duplicate and addressed to the Clinton Laboratories, advised them that the structure was complete, with possible exceptions and requested them to make any other inspections of the structure as might be necessary and if, during this inspection, no other items of exception were

determined, they were requested to approve one copy of the form and return it to the Planning and Scheduling Department.

Upon receipt of the approved BA-2 form, 12 copies of the Form BA-6 Notice of Construction Completion - Final Acceptance were prepared and executed by the Division Engineer and Field Project Manager for Construction. These forms were then submitted to Clinton Laboratories for execution on their behalf by the Plant Manager and the Area Supervisor concerned.

If, during the additional inspection made by the Clinton Laboratories, other items of exception developed, the Clinton Laboratories were requested to submit in triplicate, Form BA-3, entitled Supplementary Inspection Report, on which were listed the additional exceptions not shown on the BA-2 form. It was agreed that if Form BA-3 was not received within fifteen days after the start of operation or after the building was completed, whichever date was the earlier, that it would be assumed that the Clinton Laboratories agreed that the exceptions listed on the Form BA-2, constituted all the items required for the final completion of the structure.

Upon receipt of a BA-3 form by the Company, two copies were attached to Form BA-4 entitled Inspection Report made by Clinton Laboratories, which was addressed to the Division Engineer and requested the completion of the additional exceptions.

Upon receipt of Form BA-3 from the Division Engineer, marked up to show the date that the exceptions were completed and any other pertinent remarks concerning exceptions, a Form BA-5, Building Completion - Exceptions, was prepared and submitted to the Clinton Laboratories together with twelve copies of form BA-6.

Upon the approval of the Notice of Construction Completion - Final Acceptance forms by the Clinton Laboratories, the forms were again returned to the Planning and Scheduling Department for transmittal to an agent of the Corps of Engineers for acceptance for the District Engineer. When accepted for the Government, all copies were returned to the Planning and Scheduling Department for final distribution. Five fully executed copies of the form were sent to the District Engineer, two copies to Clinton Laboratories, the remaining copies were distributed among du Pont personnel directly interested.

On occasion it was necessary, prior to completion of certain structures, to relieve the construction stand-by men. The Division Engineers orally notified the Clinton Laboratories Maintenance Department and an inspection was made. The Clinton Laboratories Maintenance Department determined at that time whether it was satisfactory to take-over. The Division Engineer then notified the Planning and Scheduling Department that the Clinton Laboratories had orally agreed to take over maintenance who then forwarded in triplicate, Form BA-7, which was a formal request for the Maintenance Department to take over the maintenance of specified structures or equipment. When approved by the Clinton

~~SECRET~~

Laboratories, one copy of the form was returned for the du Pont files. Upon receipt of the approval to take over maintenance, the Planning and Scheduling Department notified the Division Engineer of such approval entitling him to release the construction stand-by men.

B Special Reports

1. Government Completion Report

The Completion Report for Projects 9733 and 58 was prepared at the close of construction as directed by the District Engineer in which the Project History Report was essentially used with the exception of the following changes:

1. Part I, Introduction of the Project History, was rewritten and changed to Part I Summary and included a comprehensive statement of the following items:
 - (a) A description of the Project, its location, available transportation facilities, area of site, topography, soil, and natural resources were included in concise narrative form.
 - (b) Description of the scope, the methods and materials used in construction, a description of the plant protection, and other protective security methods adopted.
 - (c) Description of contract and type as well as the names of all contractors and of the Operator.
 - (d) Factors delaying construction and weather conditions.
 - (e) Dates construction was started and completed.
 - (f) Dates of acceptance of completed work by the Clinton Laboratories and Government, and the start-up dates.
2. Part IX, discussion on Cost was deleted and du Pont Standard Cost Report for February 1944 was transposed to Government Form E.D.59B.
3. Added Part XI to show disposition of all records, drawings, and cross index of permanent record files.
4. Part XII added copy of final Field Progress Report.

Two copies of the report were submitted to the Manhattan District Office of U. S. Engineer Office and one copy was retained by the Company for the War Construction files. This report was classified as a secret document.

2. Government Construction Equipment Report

A Government Construction Equipment Report was prepared weekly in accordance with instructions received from the Area Engineer on May 4, 1943. Equipment was identified by Government Code Number, du Pont Major Equipment Number and the work-

ing, shop, and idle time were reported respectively.

3. Labor for Duration of Job

A graphical report entitled "Labor for Duration of Job" was prepared monthly and submitted to the District Engineer. This report was made in accordance with a request by the Area Engineer on August 5, 1943, and revised by the District Engineer on October 8, 1943. A photostat of this report as revised March 1, 1944, appears on Page 460.

4. Project History

The Project History was written jointly by the Planning and Scheduling Engineer and the Records Engineer. The collection of data for the History was started in September, 1943, and completed in April, 1944. Sources of information included local newspapers, U. S. Engineer's Office, Tennessee Valley Authority, the du Pont Company files, and individuals having pertinent information.

The various graphical representations included were prepared expressly for use in connection with this report with the exception of those charts which represented the requirements of Management. Photographs were obtained through the District Engineer's Office and were taken at various periods by the Government Photographer.

This History was prepared in sextuplet. Three copies were prepared for the District Engineer, and three copies were retained by the Company for the War Construction Files.

5. Labor Factors Delaying Construction

A study of labor factors delaying construction was made in July, 1943. It established that the lack of common labor not only delayed the work performed by this craft but hampered the construction efforts of other crafts as the work could not be performed in an economical sequence and required the shifting of men from one job to another in order to obtain as high an efficiency as possible.

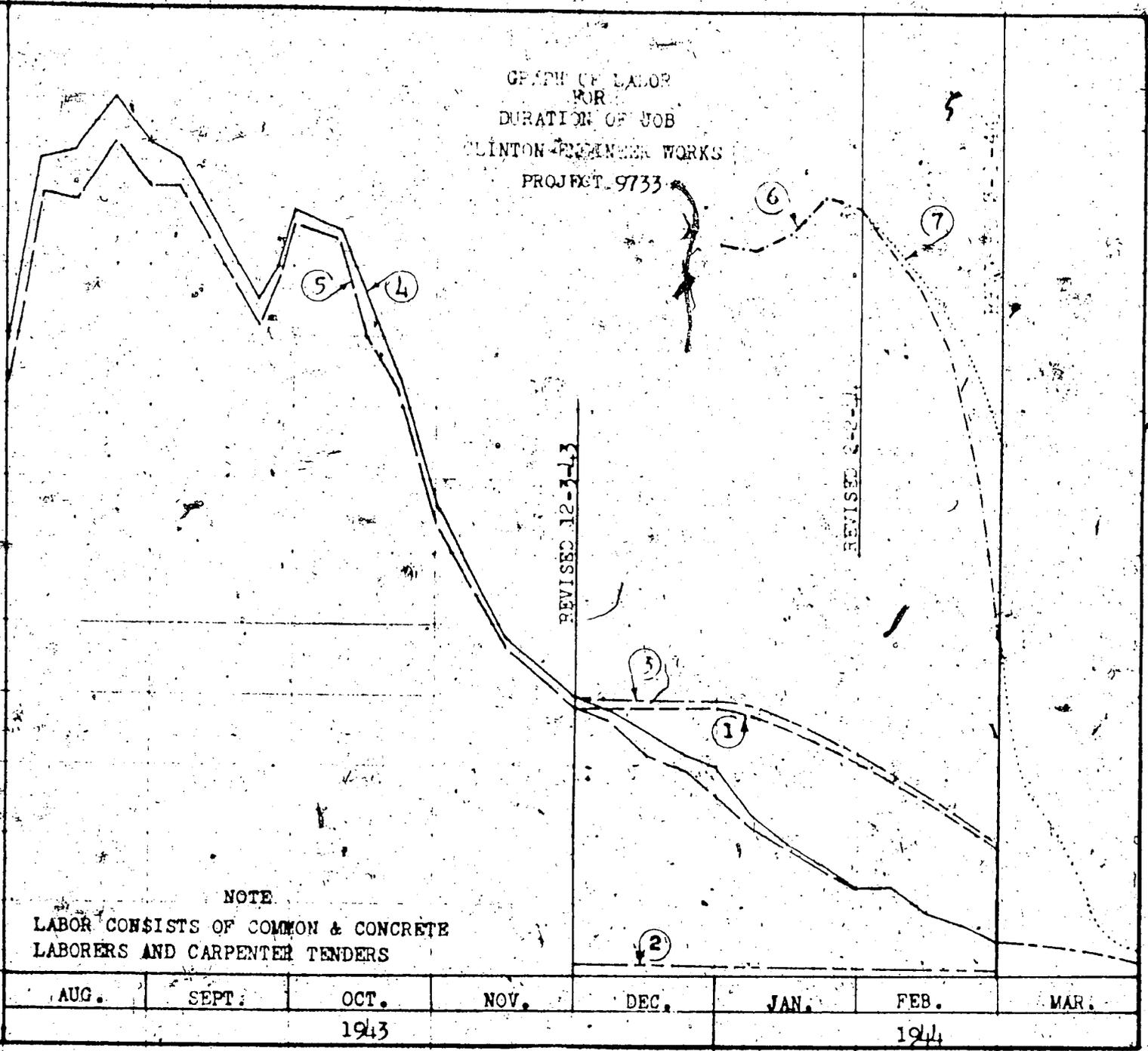
F Miscellaneous Assigned Duties

The Assistant Planning and Scheduling Engineer attended all start-up meetings and prepared a report of the minutes of each meeting. The first start-up meeting was held on August 26, 1943, in the office of the Field Project Manager, and was attended by selected personnel of Clinton Laboratories and Construction. Weekly meetings were held at which time items of exceptions and items requested by the Clinton Laboratories in connection with building acceptance were discussed, as well as what items of work were necessary for start-up. It was determined on which buildings construction should be expedited in order to assist the Clinton Laboratories in arranging for the overall start-up of the Plant. The final weekly start-up meeting was held on November 18, 1943.

GRAPH OF LABOR
 FOR
 DURATION OF JOB
 CLINTON RECREATION WORKS
 PROJECT 9733

- CURVE 1 FUTURE LABOR REQUIREMENTS
- CURVE 2 ESTIMATED LOSSES BASED ON PAST EXPERIENCE
- CURVE 3 TOTAL LABOR REQUIRED
- CURVE 4 ACTUAL LABOR PROCURED
- CURVE 5 CURVE 4 LESS ACTUAL LOSSES - ACTUAL NET GAIN
- CURVE 6 TOTAL LABOR AND CRAFTSMEN ON ROLL
- CURVE 7 TOTAL LABOR AND CRAFTSMEN REQUIRED

NUMBER OF MEN



NOTE
 LABOR CONSISTS OF COMMON & CONCRETE
 LABORERS AND CARPENTER TENDERS

AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
		1943				1944	

[REDACTED]

The Department maintained current three charts on common labor which were Schedule and Performance of Common Labor, Common Labor Curves and Employment of Common Labor. The first two charts named are discussed under Section "C", Progress of Construction and the latter under Section "E", Personnel, of Part V, General History.

A Weekly Concrete Forecast was prepared and submitted to the Government which gave the location and volume of pour expected. A forecast was prepared daily as a follow up to the weekly forecast and sent to the Government showing the concrete estimated to be poured each day during the following three day period.

The department also advised the Government of the crushed rock requirements by a forecast issued weekly which stated the tonnage and grading of the rock required.

A daily weather forecast was obtained from the Weather Bureau, located at the municipal airport in the vicinity of Knoxville and was issued to Local Management and others concerned. On Tuesdays and Fridays an extended four day weather forecast was obtained and issued to the parties concerned.

The Department also performed various special assignments given by Management.

II COSTS

A Estimates

During the course of construction at Clinton Engineer Works, three separate Cost Estimates were prepared by the Wilmington Estimating Section for Project 9733 and a single Cost Estimate was prepared for Project 58. The reason for the preparation of three estimates for Project 9733 was to include additional costs for labor, materials, temporary construction, major equipment, tools, field expense, field supervision, etc., due to the change in the scope of the work.

When a building was 60% physically complete, an estimate of cost for labor and materials required for completion was prepared by the Field Cost Engineer and a new indicated total cost for labor and materials was included in the Monthly Cost Report for the period in which this percentage was reached. This was also done for all buildings and accounts when the project as a whole attained 60% completion.

1. Original Estimates

On March 24, 1945, the original estimate totaling \$5,665,000 was submitted for Project 9733. A copy of this estimate is shown on the following page for reference. The above total did not include \$4,000,000 worth of raw material which was to be furnished by the United States Government. Of the above total, \$2,452,300 was estimated for labor, \$3,102,700 was estimated for material, \$35,000 for procurement inspection and engineering supervision, and \$75,000 for engineering design. \$350,300 Premium Pay was prorated wherever labor was involved and \$169,000 for Compensation and Liability Insurance and Liability Insurance and Social Security was carried as Field Expense. This estimate covered the following permanent construction work: Seven 100 and 300 Area Process Buildings - namely, 101, 102, 103, 105, 115, 205, and 206; thirteen 500 & 600 Area Outside Electric Lines and General Facilities - namely, 501, 603, 615, 605, 612, 614, 617, 622, 623, 624, 625, 630, and 631; twelve 700 Service Area Buildings and Facilities - namely, 701-A, 701-B, 702, 703, 706-A, 707-A, 707-B, 709, 717-A, 719, 722, 723, 725; and six 800 Area Service Buildings and Facilities - namely, 801, 802, 805, 812, 813, and 814. Buildings 722 Area Shop and 617 Sewerage Treatment Plant were never constructed and the cost estimated for this work was dropped in the succeeding revised estimate for Project 9733.

On April 27, 1945, an estimate totaling \$375,000 was prepared for Project 58. A copy of this estimate is shown on the following page for reference. The estimate covered the construction of Building 305, 500 & 600 Area Facilities for the building, the manufacture and erection of test equipment and the test work itself. Of the total estimate, \$176,770 was estimated for labor, \$174,530 was estimated for material,

**CLINTON ENGINEER WORKS
PROJECT 9733
ORIGINAL ESTIMATE**

March 24, 1943

SUMMARY

<u>Code</u>	<u>Labor</u>	<u>Material</u>	<u>Total</u>
100 Area	\$ 477,740	\$ 681,500	\$1,129,240
200 Area	381,400	590,300	941,700
500 Outside Lines Area	19,830	34,400	53,780
600 General Facilities Area	337,049	268,700	605,749
700 Administrative Area	593,880	543,100	1,139,980
800 Power & Water Supply Area	213,280	334,900	553,180
Extra Machinery	1,170	12,000	13,170
General Grading and Site Work	<u>11,630</u>	<u>15,000</u>	<u>26,630</u>
	2,013,930	2,443,900	4,463,830
Temporary Construction	89,160	75,000	174,160
Major Equipment	7,820	198,300	206,120
Small Tools	<u>5,840</u>	<u>90,000</u>	<u>95,840</u>
	2,128,800	2,813,200	4,940,000
Police Protection	75,330	2,500	78,330
Field Expense	74,670	271,000	345,670
Field Supervision	<u>175,000</u>	<u>16,000</u>	<u>191,000</u>
	2,453,300	3,102,700	5,556,000
* Premium Pay	340,300		
** Compensation & Liability Insurance		36,000	
*** Social Security		33,000	
25 Procurement, Inspection, Engineering Supervision			35,000
20 Engineering Design			<u>75,000</u>
		Sub Total	5,665,000
Initial Charge of Raw Materials to be Furnished by U.S. Gov't.			<u>4,000,000</u>
		Grand Total	\$9,665,000

* Prorated to Labor
 ** Carried as Field Expense
 *** Carried as Field Expense

**SLINTON ENGINEER WORKS
PROJECT 58
ORIGINAL ESTIMATE**

SUMMARY

<u>Code</u>	<u>Labor</u>	<u>Material</u>	<u>Total</u>
305 Building	\$ 18,900	\$ 10,100	\$ 29,000
305 Equipment	145,210	156,000	301,210
500-500 Service Lines	<u>1,570</u>	<u>1,150</u>	<u>2,720</u>
	165,680	167,250	332,930
Construction Facilities (available)	-	-	-
Police Protection	4,510	-	4,510
Field Expense	1,720	12,500	14,220
Field Supervision	<u>7,210</u>	<u>800</u>	<u>8,010</u>
	178,770	176,550	355,320
* Premium Time	12,600		
** Compensation & Liability Insurance		4,900	
*** Social Security		5,200	
25 Procurement, Inspection, Engineering Supervision			3,700
25 Engineering Design			20,000
**** Mechanical Experimental Operation	12,500	12,500	
***** Revisions and Adjustments	20,000	20,000	
		Grand Total	\$375,000
* Forwarded to Labor			
** Carried as Field Expense			
*** Carried as Field Expense			
**** Forwarded to Equipment and Labor			
***** Forwarded to Equipment and Labor			

\$8,700 for procurement, inspection, and engineering supervision, and \$80,000 for engineering design. \$12,600 Premium Pay was prorated whenever labor was involved and \$10,100 for Compensation and Liability Insurance, and Social Security were carried as Field Expense. \$41,500 was prorated to labor and the same amount was prorated to equipment to allow for mechanical experimental operations, revisions, and adjustments. No allowance was made for temporary construction facilities, major construction equipment, and small tools.

2. Estimate for Project 9733 - Revision #1

A revised estimate was issued on August 8, 1945, for Project 9733 having a new total of \$10,500,000, which was an increase of \$4,835,000 above the original estimate. A copy of this estimate is shown on the following page. The new estimate was broken down as follows: \$4,485,000 for labor, an increase of \$2,032,700; \$5,515,000 for material, an increase of \$1,412,300; \$200,000 for procurement, inspection, and engineering supervision, an increase of \$165,000; and \$800,000 for engineering design, an increase of \$200,000. Premium Pay under the new estimate was \$800,000, an increase of \$450,700. Compensation and Liability Insurance and Social Security were likewise increased in about the same proportion to a new total of \$510,000.

The reason for the revised estimate #1 was to include authorized work which had been added to Project 9733 since the original estimate was prepared and to provide for additional expenditures of labor and material revealed by the issuance of design for the Process Area Buildings. From the date of the original estimate up to the revised estimated date, additions and changes were made as follows:

1. 105 Building - 5 temporary structures added
2. 105-B Building - 3 experimental test buildings
3. 204 Process Area Laboratory Building
4. 501 - Additions to Outside Electric Lines and Substations
5. 604 - Autos, trucks, and cranes, and truck scale
6. 615 - Permanent Parking Lot
7. 620 - Process Lines
8. 632 - White Oak Creek Dam
9. 600 Area - Additions to all existing facilities, Overhead & Underground Lines
10. 701-A - Second-story addition to Clock Alley
11. 706-B - Laboratory
12. 706-AA - Oil Storage House
13. 713-A - General Store House
14. 713-B - Temporary General Store House
15. 714 - Storage Platform
16. 715 - Flag Pole
17. 717-B - Special Machine Shop
18. 724 - Gas Station
19. 726 - Propane Gas Storage Building & Lines

CLINTON ENGINEER WORKS
PROJECT 8788
ESTIMATE REVISION #1

August 8, 1945

SUMMARY

<u>Code</u>	<u>Labor</u>	<u>Material</u>	<u>Total</u>
100 Area Process	\$1,280,300	\$1,772,050	\$ 3,052,350
200 Area Process	688,050	688,400	1,376,450
500 Area Outside Electric Lines	54,840	45,000	99,840
600 General Facilities & Service Lines	488,580	547,800	1,036,380
700 Administration Maintenance	744,670	984,000	1,728,670
800 Power	401,160	461,800	862,960
Extra Machinery	670	4,080	4,750
Site Work, General Grading, Landscaping	<u>41,430</u>	<u>6,000</u>	<u>47,430</u>
	3,708,700	4,504,000	8,212,700
Temporary Construction	166,940	130,000	296,940
Major Equipment	4,870	240,000	244,870
Small Tools	<u>12,190</u>	<u>158,000</u>	<u>170,190</u>
	3,889,700	5,032,000	8,921,700
Police Protection	138,810	2,500	140,810
Field Expense	121,880	438,000	559,880
Field Supervision	<u>335,130</u>	<u>45,800</u>	<u>380,930</u>
	4,485,000	5,515,000	10,000,000
* Freight Pay	300,000		
** Compensation & Liability Insurance		180,000	
*** Social Security		150,000	
ES Procurement, Inspection, Engineering, Supervision			200,000
ED Engineering Design			<u>300,000</u>
		Grand Total	\$10,500,000
* Freight to Labor			
** Carried as Field Expense			
*** Carried as Field Expense			

- 20. 735 - Training School
- 21. 607 - Water Treatment House Building
- 22. 615 - Addition to Filter Plant
- 23. 615 - Elevated Water Storage Tank

The additional scope of work indicated above made necessary the increase in the estimates for Construction Facilities, Field Supervision, Field Expense, Subcontracts, and Suspense Accounts.

3. Estimate for Project 9735 - Revision #2

An addition to the estimate amounting to \$697,000 was prepared on December 27, 1943, to cover the construction of four new 700 Service Area Buildings (706-C, 707-B, 707-C and 723) and additions to four existing structures (701-A, 706-A, 708 and 717-B) and the required 500 and 600 Outside Lines & General Facilities for these buildings. These new buildings and additions were constructed by du Pont and were requested by Clinton Laboratories for further flexibility in the operation of the plant. The additional construction was authorized by the District Engineer, Manhattan District, Corps of United States Engineers. Also included in this estimate was \$41,510 for buildings 720 and 737, authorized construction work performed since the revised estimate of August 6, 1943. A summary of the additional estimate is included on the following page. Of this estimate, \$374,300 was for labor, \$285,700 was for material, \$25,000 for engineering design, and \$16,000 for engineering supervision. \$50,000 Premium Pay was prorated to labor.

B Final Cost Report

For all practical purposes, our discussion on Cost for Projects 9735 and 88 will be based on the February Cost Report which included pay roll figures for week ending February 27, 1944. Copies of these reports are included herein and the figures shown in this report are indicative of final costs as these projects were nearly complete on this date. Copies of the Final Cost Reports will be inserted as an addendum to this History at a later date.

1. Project 9735

The February Monthly Cost Report carried a combined estimate of \$11,197,000. This estimate included the original, the revised, and the additional estimate but did not include a credit of \$54,058 for performing Field Change Requests requested by the plant operators. The total expenditures by du Pont and the Government up through this report period were \$11,015,969. At this time, it was estimated that \$89,517 for labor and \$86,159 for material, totaling \$175,676, would be required to complete this project. By using these estimated figures and making an allowance of \$159,761 for transfers out of M.B. Materials and other materials now in construction accounts, the


CLINTON ENGINEER WORKS
PROJECT 9733
ESTIMATE REVISION #2

December 17, 1948

SUMMARY

<u>Code</u>	<u>Labor</u>	<u>Material</u>	<u>Total</u>
500 Outside Lines Area	\$ 4,990	\$ 4,900	\$ 9,890
600 General Facilities Area	27,350	18,100	45,450
700 Administrative Area	<u>284,580</u>	<u>208,510</u>	<u>493,090</u>
	316,700	231,510	548,210
CF Construction Facilities	<u>4,710</u>	<u>8,190</u>	<u>12,900</u>
	321,410	239,700	561,110
FE Wilmington Expense	18,230	20,000	38,230
FE 11 Insurance		10,000	10,000
FE 16 F.O.A.B. Unemployment Tax		<u>12,000</u>	<u>12,000</u>
	337,640	281,700	619,340
FS Field Supervision	<u>38,660</u>	<u>2,000</u>	<u>40,660</u>
	374,300	283,700	658,000
ED Engineering Design		23,000	23,000
ES Engineering Supervision		16,000	16,000
• Premium Pay	50,000		
			<u>697,000</u>
• Provided to Labor			

MONTHLY COST REPORT
 MONTH ENDING WORKING

PROJECT NO. 5723 ACCOUNT 6-A

PERIOD ENDING: February 28, 1953
 INCLUDING PAYROLL WORK DURING February 27, 1953

CODE	TITLE OR DESCRIPTION	ACTUAL EXPENDITURES		COMMITMENTS	TOTAL	%	ESTIMATE TO COMPLETE			INDICATED TOTAL COST			REMARKS	
		LABOR	MATERIAL				LABOR	MATERIAL	TOTAL	LABOR	MATERIAL	TOTAL		
ENGINEERING SERVICES ACCOUNT														
20	Engineering Design	209,958		73,000	282,958							305,000	305,000	64,107 of Com. to Relay
20	Engineering Supervision	186,790		143,907	330,697							216,000	216,000	64,709 of Com. to Relay
20	Field Supervision	439,409	33,336	8,099	480,844	99						371,750	37,900	409,650
20	Field Expense	809,647	467,770	99,000	1,376,417	99						276,400	479,900	756,300
CONSTRUCTION FACILITIES ACCOUNT														
20	Construction Facilities (50-40-03-07)	100,170	260,776	2,901	363,847	99						100,750	256,150	357,900
EXPENSE ACCOUNT														
20	Miscellaneous Supplies	9,777	17,318	29,029	46,094									
20	Subcontract		4,875	11,170	16,045									
20	Expense Account		430	66,078	66,508									
GENERAL CONSTRUCTION ACCOUNT														
20	Site Work	23,369	2,179		25,548	100						20,370	3,000	23,370
20	General Grading	40,000	3,000		43,000	99						17,150	2,700	19,850
20	Extra Machinery		50,371	3,937	54,308	99						670	4,090	4,760
20	Landscaping	4,000	100		4,100	100						3,070	300	3,370
200	100 Area	1,009,409	1,999,933	19,600	3,028,942	100						1,000,000	1,770,000	2,770,000
200	200 Area	700,000	600,000	20,000	1,320,000	100						600,000	600,000	1,200,000
200	300 Area	60,000	90,000	1,000	151,000	99						90,000	60,000	150,000
200	400 Area	300,000	400,000	500	700,500	99						300,000	400,000	700,000
200	General Facilities Outside Area	1,000,000	200,000	75,000	1,275,000	99						1,000,000	1,100,000	2,100,000
200	Service Area No. 1	1,000,000	200,000	75,000	1,275,000	99						1,000,000	1,100,000	2,100,000
200	Service Area No. 2	1,000,000	200,000	75,000	1,275,000	100						1,000,000	1,100,000	2,100,000
Grand Total		5,933,338	4,017,607	636,000	11,015,945							4,079,300	6,337,700	11,197,000
Materials furnished by Government without charge			800,750	79,064	900,814									
Materials transferred to other Government projects with suballotment			615,073		615,073									
Suballotment charges against Project Appropriation		5,933,338	4,019,909	957,750	10,911,007	99								
Materials furnished and paid for by Government		353,022	300,750	200,725	854,507									
Materials transferred to other Government projects with suballotment														
Expenses by the Post		5,177,706	4,019,119	309,000	9,505,825									
Miscellaneous		4,999	4,697		9,696									
Payroll and materials furnished Operations (Not included above)														
Materials furnished by Government without charge - 899,064 Commitments represents 200 Orders including credits on 20,000 Orders which will be journalized as transfers to other suballotment when R.R. 1 transfers credit. Allotment has been made to Estimate to complete for distribution of 850,000 credited Commitment on 20,000 Orders Orders, and other 200 Commitments have been placed to amounts allocated for them.														
Materials transferred to other Projects without suballotment - 61,709 of material figure represents value of material for which project appropriation will not receive credit, because payment has been made to Treasury of U. S. instead of the Post.														

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J. H. Williams
 J. H. WILLIAMS, VICE PRESIDENT

Filed Feb - - - - -

Materials furnished without charge
 credit for this charge
 suballotment - 850,000
 to this expense has been
 journalized to date.

PROJECT NO. 9735 ACCOUNT 8-1
 WAB CONSTRUCTION DIVISION

MONTHLY COST REPORT
 (SLIPPER BUSINESS) WORKS

PERIOD ENDING FEBRUARY 27, 1950
 INCLUDES PAYROLL WEEK ENDING FEBRUARY 27, 1950

CODE	NAME OR DESCRIPTION	ACTUAL EXPENDITURE		COMMITMENTS	TOTAL	ESTIMATE TO COMPLETE				INDICATED TOTAL COST			ESTIMATE BUDGET 8-6 and 12-17 1951			REMARKS	
		LABOR	MATERIAL			LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL		
FIELD EXPENSES																	
FD-1	Construction Department - Clerical	158,548	8,875	49	177,521												
FD-2	Construction Department - Engineering	183,117	18,093	3,143	204,353												
FD-3	Accounting & Billing Department	37,676	2,476		40,152												
FD-4	Purchasing Department	29,970	2,598	49	32,617												
FD-5	Order Division (Wilmington)	7,042			7,042												
FD-6	Expediting Division	13,788	1,546		15,334												
FD-7	Traffic Department	2,312	612	300	3,224												
	Sub Total	439,409	33,136	4,035	476,576												
Field Expenses																	
FD-1	Fire Protection	5,047	474		5,521												
FD-2	Police Protection	110,296	275		110,571												
FD-3	Sanitation	5,988	2,861	45	8,894												
FD-4	Waste Safety	17,704	4,746	254	22,704												
FD-5	Medical Services	17,724	1,777	273	21,774												
FD-6	Employment of Labor	89,587	68,453	1,442	159,482												
FD-7	Reproducible General Office Supplies	276	78,019	1,635	80,930												
FD-8	Reproducible Engineering Supplies and Rental and Repairs of Instruments	509	743		1,252												
FD-9	Light, Heat, Power and Water	168	1,597	189	1,954												
FD-10	Permit Fee		1,374		1,374												
FD-11	Insurance		105,581	37,000	142,581									170,000	170,000		Comm. Estimated to date
FD-12	Salaries of Chauffeurs for Plant Cars	5,733			5,733												
FD-13	Program Photographs		69	69	138												
FD-14	Vacations		12		12												
FD-15	Stability Vapors	4,336		4,136													
FD-16	Food and Employment Taxes		187,743		187,743									162,000	162,000		
FD-17	Furniture and A & S Group Life Insurance		14,811		14,811												
FD-18	Payment of Vapors in Lieu of 7 Days notice																
FD-19	Blue Prints, Photostats	305	1,579	203	2,087												
FD-20	Wilmington Office-Blue Prints, Photostats			2,402	2,402												
FD-21	Moving Temporary Offices to Plant Site	1,581		86	1,667												
FD-22	Military Hall (School Barbers)	5,535			5,535												
FD-23	Labor and Reproducible Supplies - Barbours	22,320	3,752	150	26,222												
	Sub Total	405,617	467,770	55,000	868,387									476,000	479,500	759,500	
CONSTRUCTION FACILITIES ACCOUNT																	
CF-1	Temporary Construction	97,298	121,336	979	220,613	99								171,690	130,000	306,690	219,490 transferred from CF-10 credit to Permanent Bldg. on credit to date to cover 90 Bldg. and Partition which are permanent construction. Credit represents estimate of material job to be transferred on without obligation.
CF-2	Major Equipment	1,371	99,413		100,784	100								4,870	240,000	244,870	
CF-3	Major Equipment Maintenance			648	648	100											
CF-4	Minor Equipment	138	30,542		30,680	100											
CF-5	Minor Equipment Maintenance			809	809	100								12,190	161,770	173,960	
CF-6	Small Tools	4,369	21,485		25,854	100											
CF-7	Small Tools Maintenance																
	Sub Total	103,176	252,776	1,436	357,388	99								188,750	536,190	724,940	

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PROJECT NO. 1731 ACCOUNT 8-1
 TAB CONSTRUCTION DIVISION

MONTHLY COST REPORT
 (LIVESTOCK BUILDINGS) WORKS

FURCO ENGINE COMPANY INC. 10/1
 INCLUDES PAYROLL WEEK ENDING FEBRUARY 27, 1953

CODE	TITLE OR SUB-DIVISION	ACTUAL EXPENDITURES		COMMITMENTS	TOTAL	ESTIMATE TO COMPLETE			INDICATED TOTAL COST			ESTIMATE DATED 2-6 and 12-31			REMARKS
		LABOR	MATERIAL			LABOR	MATERIAL	TOTAL	LABOR	MATERIAL	TOTAL	LABOR	MATERIAL	TOTAL	
		01	02	03	04	05	06	07	08	09	10	11	12	13	
GENERAL ACCOUNTS															
00-2	Roofing			6,905	6,905										
00-6	Excavation														
00-8	Roofing and Grading														
00-10	Piping (Plumb Fee Only)		4,275	4,275	4,275										
00-11	Electrical (Plumb Fee only)			1,950	1,950										
	Sub Total		4,275	13,170	17,445										
GENERAL ACCOUNTS															
1-1	Crew's Superintendence, Maint., Privies, Misc. Building, etc., not chargeable to specific Bldg.			728	728										
1-5	Subsidiary Items			150	150										
1-13	SPG Orders			64,000	64,000										
1-24	Miscellaneous Instruments		150		150										
1-25	Overhead of Government Equipment														
1-28	Maintenance of Roads														
	Sub Total			150	68,878	69,308									
GENERAL CONSTRUCTION ACCOUNTS															
100	100 Area														
100-3	100 Building	44,945	16,415		61,360	100				57,650	28,800	16,550	103,000	83,500 to 1946 (141 BLDG)	Transfer to Perm. Structures
101-3	100 Equipment	26,488	24,492	13	50,993	100				29,680	30,950	60,630	121,720 to 1973 (144 Change Bldg. 10000 to 713 (100 Bldg. Bldg. 1)		
100-3	100 Building	6,499	3,627		10,126	100				7,310	5,600	12,910			
100-3	100 Equipment	490	3,467	1,017	4,974	100				20,050	6,500	26,550			
105-3	105 Building	1,004	967		2,051	100				1,830	1,400	3,230			
105-3	105 Building	211,512	131,153	1,705	344,370	100				178,830	194,750	333,580			
105-3	105 Equipment	767,118	1,353,940	130,817	2,251,875	100				220,730	1,499,450	2,340,240			
115-3	115 Building	74,752	24,850		101,602	100				67,000	36,000	103,000			
115-3	115 Equipment	64,531	10,222	1,074	115,827	100				57,120	37,700	94,820			
	Sub Total	1,229,449	1,999,911	144,646	2,494,006	100				1,220,300	1,772,050	1,938,370			
GENERAL CONSTRUCTION ACCOUNTS															
200	200 Area														
204-3	204 Building	5,275	2,172	5	7,452	100				2,150	1,800	3,950			
204-3	204 Equipment	7,483	11,152	262	18,903	100				6,230	12,110	18,340			
205-3	205 Building	200,692	94,040	80	294,812	100				128,080	117,000	245,080			
205-3	205 Equipment	105,227	426,466	24,671	556,364	100				111,950	447,150	559,100			Buy 20 and 200 allocation and interest Budget Manager
206-3	206 Equipment	165,204	199,442	25	364,671	100				125,000	105,200	230,200			Sub Ledger Added
	Sub Total	723,881	821,272	25,043	1,570,196	100				474,050	651,400	1,125,450			
GENERAL CONSTRUCTION ACCOUNTS															
900	Outside Electric Lines														
901	Electric Substation and outside Wiring	64,615	90,604	1,956	157,175	99				52,830	49,900	102,730	220,000 from 19-15 Electric Lines		
	Sub Total	64,615	90,604	1,956	157,175	99				52,830	49,900	102,730			

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PROJECT NO. 373 ACCOUNT 6-1
 CONSTRUCTION DIVISION

MONTHLY COST REPORT
 CLOSED WORKS

PERIOD ENDING FEBRUARY 28, 1953
 INCLUDING PAYROLL WEEK ENDING FEBRUARY 27, 1953

CODE	TITLE OR DESCRIPTION	ACTUAL EXPENDITURE			COMMITMENTS	TOTAL		ESTIMATE TO COMPLETE					INDICATED TOTAL COST			REMARKS	
		LABOR	MATERIAL	OTHER		LABOR	OTHER	LABOR	MATERIAL	OTHER	LABOR	MATERIAL	OTHER				
600	General Partitions Outside Lines																
601	Roofs and Walls	86,908	136,460	99	223,367	99								77,130	131,000	208,130	
604	Doors, Windows and Screens	1,620	14,199		15,819	100								6,700	36,900	43,600	
609	Fences	87,760	4,971		92,731	99								13,160	4,400	17,560	
612	Open Drainage Systems	4,799	8,893		13,692	100								910	1,320	2,230	
613	Permanent Parking Lot	8,733	1,875		10,608	100								1,870	6,000	7,870	21,900 from 60-07 Parking Lot
614	Sound Barriers	6,409	4,918		11,327	100								8,990	5,390	13,900	
615	Phone Lighting	8,185	6,408		14,593	100								6,300	7,900	13,400	
620	Overhead Steam	59,900	18,304	89	78,204	100								18,100	19,300	37,400	
621	Underground Water	188,814	188,899	888	377,713	100								188,000	131,000	319,000	9700 from 70-19 Water Main
626	Air Lines	2,998	604	3	3,605	100								7,000	8,070	11,070	
629	Conduits and Electric Cables	48,196	86,893		135,089	100								17,900	18,000	35,900	1000 from 70-17 and 70-18 700 from 70-17 and 70-18
630	Process Lines and Conduits	96,132	99,571	46	195,709	100								129,990	126,000	255,990	
631	Flue Protection	39,001	17,908	94	56,909	100								40,130	36,700	76,830	
632	Outside Overhead Line Supports	89,994	8,100		98,094	100								80,900	18,090	98,990	
633	Rail and Motor Cuts	19,132	7,911	116	27,059	100								21,930	18,000	39,930	
	Sub Total	909,999	1,002,402	981	1,912,401	99								513,930	566,000	1,079,930	
700	Service Area No. 1																
701-0	Auto Buses and Coach Alley Buildings	14,997	1,807	14	16,808	100								6,600	6,900	13,500	2 Bldg. Additions
701-1	Auto Buses and Coach Alley Equipment	4,990	1,800	10	6,790	100								5,900	6,900	12,800	
701-2	Telephone System	1,470	3,199	112	4,769	99								1,000	34,000	35,000	General System Added
702-0	Main Office Building	109,679	63,871	86	173,550	100								99,700	97,300	197,000	690,000 from 60-20, 60-21 for 702-0 Bldg.
702-1	Main Office Equipment	7,000	19,999		26,999	100								5,710	39,900	45,610	
704-0	Supervisor's Office Building	4,400	1,600	7	6,007	100											1000 from 60-1 (Bldg) and 200 from 70-0
704-1	Supervisor's Office Equipment	183	60		243	100											6130 from 60-20 Bureau Office for 704-0
706-0	Laboratory Building	300,416	193,406	14,004	497,826	99								312,990	219,900	532,890	706-0 Change Bldg. 706-0 2 Supervisor Bldg. and 706-0 added.
706-1	Laboratory Equipment	880,990	873,109	49,630	1,763,729	99								396,960	904,000	1,300,960	
707-0	Change House Building	30,712	16,400	475	47,587	99								39,090	19,760	58,850	8199 from 60-1 Change Bldg. of 707-0
707-1	Change House Equipment	1,700	8,600	12	10,312	99								1,600	8,000	9,600	2 Bldg. Additions, one to new and one existing building.
708-0	Cafeteria Building	99,709	17,006	805	117,520	99								99,460	28,900	128,360	
708-1	Cafeteria Equipment	11,696	12,390	6,689	30,775	98								13,470	20,300	33,770	
713-0	General Storehouse Building	96,167	87,121	87	183,375	99								19,900	18,000	37,900	600,000 from 60-1, 60-10 and 60-11 Bldg. to cover 713-0 Bldg. 60-1, 60-10 and 60-11 Bldg. (713-0 built before 713-0 in original layout)
713-1	General Storehouse Equipment	4,731	8,152		12,883	99								100	1,900	2,000	
714-0	Storage Platform	12,115	4,533		16,648	100								2,000	2,900	4,900	600,000 from 714-0 at cost.
715-0	Flag Pole and Flags	30	36		66	100								100	100	200	
717-0	Shop and Supply Storage House Building	90,000	43,093	888	133,981	99								99,900	87,500	187,400	600,000 from 60-22, 60-23, 60-24, 60-25 to cover 717-0 Bldg. 60-22, 60-23, 60-24, 60-25
717-1	Shop and Supply Storage House Equipment	18,519	60,076	2,901	81,496	99								20,000	63,900	83,900	Bldg. Additions and Services on 717-0 and 717-1 increased cost
719-0	First Aid House and Service Building	58,100	89,866	8	147,974	100								53,750	87,900	141,650	
719-1	First Aid House and Service Equipment	19,671	49,519	1,999	71,189	100								12,060	99,600	111,660	
720-0	Patrol Headquarters Building	31,977	1,110		33,087	100								30,050	10,000	40,050	
720-1	Patrol Headquarters Equipment	1,801	790		2,591	100								2,300	7,000	9,300	
723-0	Laundry Building	10,121	3,189	604	13,914	99								8,970	3,970	12,940	
723-1	Laundry Equipment	4,645	8,372	899	13,916	99								3,310	8,970	12,280	
724-0	Gas Station Equipment	870	606	30	1,506	100								1,000	600	1,600	

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PROJECT NO. 5731 ACCOUNT No.

CONSTRUCTION DIVISION

MONTHLY COST REPORT

PERIOD ENDING FEBRUARY 28, 1966

Sheet No. 5

CODE	TITLE OR DESCRIPTION	ACTUAL EXPENDITURE		COMMITMENTS	TOTAL	%	ESTIMATE TO COMPLETE				INDICATED TOTAL COST				INCLUDE PATROLL WORK (EXCEPT FOR...)			REMARKS
		LABOR	MATERIAL				SUB	TOTAL	LABOR	MATERIAL	SUB	TOTAL	ESTIMATE DATED 2-6 and 12-17					
													LABOR	MATERIAL	TOTAL			
Service Area No. 1 (Cont'd)																		
705-B	Parking Garage Building	20,605	0,000		20,605	100												
705-C	Parking Garage Equipment	2,904	0,075	20	5,011	100							5,100	4,000	9,100		011,000 from 57-19 to cover	
706-B	Propane Storage - Tanks and G. S. Lines	11,614	0,000		16,513	100							000	2,000	3,000		transfer to 705-B. Equipment inside 705-A addition.	
709-B	Open Machinery Storage Building	0,000	000	7	2,900	100							5,000	6,500	11,500			
709-C	Training School Building	20,103	7,000		27,003	100												0000 from 56-61 for 709A
709-D	Training School Equipment	779	2,010		2,777	100							12,500	2,700	21,600			
707-B	Auto Shelter Building	700	100		870	100							1,000	4,000	5,000			
709-E	Pistol Range	110	110		220	100							900	000	1,100			
Sub Total		1,070,056	291,611	76,310	2,178,737	99							1,009,030	1,190,900	2,000,000			Transferred from 56-50 - 0025
Service Area No. 2																		
001-B	Boiler House Building	73,507	40,100		117,721	100												
001-C	Boiler House Equipment	120,136	150,900	3,707	280,050	100							53,600	41,100	94,700		Deep foundation work, lab. and office added, and provisions for increased costs of Bldg.	
000-B	Reservoir Equipment	13,500	9,600		23,000	100							160,510	199,000	319,510			
005-B	Purchased Power	0,000	34,700		47,516	100							12,000	13,300	25,300			
007-B	Water Treatment House Building	40,477	9,067		50,500	100							2,000	20,500	26,500			
007-C	Water Treatment House Equipment	40,000	20,000	3,600	100,000	100							20,000	10,000	30,000			
011-B	Brickling Water Hall Building	700	177		957	100							30,000	67,100	97,100			
011-C	Brickling Water Hall Equipment	5,000	6,000	100	10,100	100							000	100	100			
010-B	Reservoir Pump House Building	5,100	1,000		7,100	100							5,000	7,700	12,900			
010-C	Reservoir Pump House Equipment	10,000	10,000		20,000	100							5,000	1,000	6,000			
013-B	Filter Plant Building	17,000	7,000		24,000	100							5,000	13,000	18,000			
013-C	Filter Plant Equipment	25,000	35,000		61,000	100							16,000	11,000	27,000			
015-B	Mixer Pump House Building	29,000	13,000		41,000	100							31,000	39,000	70,000			
015-C	Mixer Pump House Equipment	6,000	12,000	100	18,000	100							29,000	21,000	50,000		Bldg. enclosure for Bldg. added.	
019-B	Overhead Water Storage Tank	11,000	10,100		21,700	100							7,000	13,000	20,000			
Sub Total		403,700	406,700	7,070	818,510	100							160,000	161,000	321,000			

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PROJECT NO. 772 ACCOUNT 0-1

MONTHLY COST REPORT
CLEVELAND BRIDGE WORKS

PERIOD ENDING FEBRUARY 27, 1946
INCLUDES PAYROLL WEEK ENDING FEBRUARY 27, 1946

NO.	NAME OF CONTRACTOR	APPROX. EXPENDITURES		COMMITMENTS	FYAL	ESTIMATES TO COMPLETE			INDICATED TOTAL COST			REMARKS
		LABOR	MATERIAL			LABOR	MATERIAL	TOTAL	LABOR	MATERIAL	TOTAL	
00-10	R. F. Gray Company - WFO 4	617,300	130,550	0,000	762,407				205,000	205,000	410,000	
	Flood Fee		4,075	4,075	9,950							
	Insurance & Taxes		10,516		10,516							
00-11	Brookway Maintenance Corp. WFO 304	400,000			400,000				60,000		60,000	
	Flood Fee			1,550	1,550							
	Insurance & Taxes		19,350		19,350							
011-0	Lupton Contract Company WFO 374	977	5,973		6,950							
00-5	Henry Construction Company WFO 09	900	1,407		2,307							
00-6	Johnson & Willard WFO 009	1,176	1,969		3,145							
00-6	Albert Bros., WFO 020	80,160	211,053		291,213							
00-5	Johnson & Willard WFO 021	10,123	10,015		20,138							
00-0	Lisk Bolt Company WFO 304	1,550	11,591		13,141							
00-0	Chicago Bridge & Iron Company WFO 004	0,000	6,550		6,550							
00-0	East Engineering (WFO) WFO 105	15,310	30,718	2,031	48,059							
00-0	J. E. Wynn WFO 113	17,100	25,130		42,230							
00-0	Grant Co. Company, Inc., WFO 114	29,696	60,070		90,566							
00-0	Hampton Erector Company, WFO 024	1,530	10,010		11,540							
00-1	J. D. Britton Roofing Company WFO 307	7,323	17,695		25,018							
00-0	Henry Construction Company WFO 130	10,070	9,790		19,860							
00-0	Harbor Erector Company, WFO 307	1,000	4,000		5,000							
00-0	Holtz Construction Company, WFO 100	7,990	7,400	1,600	16,990							
00-0	Orinelli Company, Inc., WFO 305	0,470		9,070	9,540							
719-0	General Electric X-Ray Corp. WFO 164	37	1,760		1,797							
00-0	Armstrong Bolt Company WFO 700	15,066	13,977	6,900	35,943							
00-0	Young & Burthe Company, WFO 005	1,575	6,047		7,622							
1-1	O'Neil Contracting Company WFO 037	10	65		75							
00-0	Construction Engineering Company WFO 303	50	100		150							
00-101	Chattanooga Boiler & Tank Co. WFO 307	361	606		1,007							

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PROJECT NO 54 ACCOUNT 8-2

MONTHLY COST REPORT
CLEVELAND WORKS

PERIOD ENDING February 29, 1954
INCLUDES PAYROLL WEEK ENDING February 21, 1954

CODE	TYPE OF EXPENDITURE	ACTUAL EXPENDITURES		COMMITMENTS	TOTAL	ESTIMATE TO COMPLETE		INDICATED TOTAL COST		ESTIMATE BATES		REMARKS		
		LABOR	MATERIAL			LABOR	MATERIAL	LABOR	MATERIAL	LABOR	MATERIAL			
ENGINEERING SERVICES														
22	Engineering Design	18,141		10,064	28,205							20,000	20,000	27705 of Com. to Salary
23	Engineering Supervision	5,160		4,170	9,330							5,700	5,700	27712 of Com. to Salary
70	Field Supervision	12,960	605	12	13,577	95				7,828	800			8,010
70	Field Expense	4,798	953	1,906	14,671	95				6,030	12,500			18,530
CONSTRUCTION SERVICES														
GENERAL CONSTRUCTION SERVICES														
24	Travo Machinery			100		170	100							
300	300 Area	61,516	107,070	40,000	211,615	95				162,160	160,100			322,260
500	500 Area	220	117		337	100				270	250			520
600	600 Area	1,111	704		1,815	100				1,100	800			1,900
	Grand Total	179,936	116,971	54,861	371,768					176,770	190,650			373,000
	Materials furnished by Government without charge		9,494		9,494									
	Materials transferred to other Government projects			131	131									
	Total amount charged against Project appropriations	179,936	111,709	54,861	371,768	95								
	Materials furnished and paid direct by Government	25,308		14,973	40,317									
	Materials transferred to other Government projects with reimbursement													
	Expediture by de Post	22,572	111,709	41,000	375,281									

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Filed Feb - - - - -

J. J. Williams in Charge
J. J. Williams, Field Engineer

Sanitation District Direct Payments for Wilm. Charges:
Expenditures - \$25,308
Commitments - \$40,317
to Wilm. Expense has been journalized to date.

MONTHLY COST REPORT

CODE	DESCRIPTION	ACTUAL EXPENDITURE		COMMODITIES	TOTAL	C	ESTIMATE TO COMPLETE			INDICATED TOTAL COST			REMARKS	
		LABOR	MATERIAL				LABOR	MATERIAL	TOTAL	LABOR	MATERIAL	TOTAL		
70	GENERAL EXPENSES													
70-1	Construction Department - General	3,100			3,100									
70-2	Construction Department - Engineering	7,900	60	30	8,000									
70-3	Accounting & Auditing Department	670			670									
70-4	Purchasing Department	500			500									
70-5	Other Divisions (Wilmington)	115			115									
70-6	Expediting Division	800			800									
70-7	Staff Department	100			100									
	Sub Total	14,990	60	30	15,080	99						7,000	600	8,000
70	Field Expenses											1,700	2,400	4,100
70-1	Fire Protection	60			60									
70-2	Police Protection	2,067			2,067							4,300		4,300
70-3	Sanitation	99	80		179									
70-4	Water Supply	809	60	9	878									
70-5	Medical Services	307	73		380									
70-6	Equipment of Labor	1,600	1,400		3,000									
70-7	Dependable General Office Supplies		1,400	0	1,400									
70-8	Dependable Engineering Supplies and Material and Repair of Instruments	0	12		12									
70-9	Light, Heat, Power and Water		30		30									
70-10	Public Use													
70-11	Insurance		1,070	1,000	2,070								4,300	4,300
70-12	Salaries of Chauffeurs for Plant Cars	100			100									
70-13	Progress Photographs													
70-14	Vehicles													
70-15	Stability Test													
70-16	Food and Employment Camp		2,000		2,000								5,000	5,000
70-17	Excavation and A & E and Group Life Ins.		800		800									
70-18	Payment of Rents in Lieu of 7 days notice													
70-19	Map Prints, Photostats	10	30		40									
70-20	Wilmington Office - Map Prints, Photostats			710	710									
70-21	Survey Temporary Offices to Plant Site													
70-22	Military Roll													
		4,790	7,910	1,905	14,605	99						6,000	12,900	16,500

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PROJECT NO. _____ ADDRESS _____
 THE CONSTRUCTION DIVISION

MONTHLY COST REPORT
 (MONTH ENDING) _____

REPORT PERIOD: MONTH ENDING _____
 INCLUDES PHYSICAL WORK COMPLETED THROUGH _____

CODE	TITLE OR DESCRIPTION	ACTUAL EXPENDITURE			TOTAL ESTIMATE	PERCENT COMPLETED	ESTIMATE TO COMPLETE			INDICATED TOTAL COST			REMARKS	
		LABOR	MATERIAL	EQUIPMENT			LABOR	MATERIAL	EQUIPMENT	LABOR	MATERIAL	EQUIPMENT		
GENERAL CONTRACTOR														
300	300 Area	40	30	0	100	100								
305-B	305 Building	50,000	100,000	10,000	160,000	75								
375-B	375 Equipment													
	Sub Total	50,040	100,030	10,000	160,070	75								50,000 transferred to 30-1 to cover 317-B Shop to permanent construction.
GENERAL BUILDING TRADES														
300	300 Electric Installation and Outside Wiring	100	117		217	100								
	Sub Total	100	117		217	100								
GENERAL PAINTING TRADES														
300	300 Paint and Varnish	30	100		130	100								
305	305 Paper	100	75		175	100								
300	300 Putty and Seal	100	100		200	100								
305	305 Stenciling Paper	100	100		200	100								
300	300 Air Mass	100	100		200	100								
305	305 Portable Painted Man Reports	100	100		200	100								
	Sub Total	1,110	775		1,885	100								

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indicated total cost for Project 9733 would be \$11,051,684, an "under-run" of approximately \$145,116. The total expenditures by du Pont up through this report period were \$9,545,868, and materials furnished and paid for direct by the Government, not including an unknown value for special material, amounted to \$1,185,317, or a total of \$10,729,185 that was charged against the project appropriation. Materials and equipment valued at \$901,857 were furnished by the Government without charge. Of this amount, \$615,073 was transferred to other government projects without suballotment. It was estimated at this time that an additional \$80,000 of material and equipment would be transferred to other government projects without suballotment during the next report period. This would further reduce the "under-run" to \$65,169, not including credits for Field Change Requests.

(a) General Construction Accounts

Included in the General Construction Accounts are site work, general grading, extra machining, landscaping, and all the permanent construction work included in Areas 100, 200, 500, 600, 700, and 800.

A total of \$2,939,966 was expended through this report period for the construction of the 100 Area, estimated at \$3,052,350. An estimate of \$15,250 for labor and materials was made to complete construction work in this area, indicating an "under-run" of approximately \$109,134. Expenditures to date for the 200 Area totaled \$1,501,328 against an estimate of \$1,379,450. The estimated cost for labor and materials to complete construction in this area was \$58,595, indicating an "over-run" of approximately \$180,473.

The total expenditures for the 500 Area to date was \$115,419, against an estimate of \$109,730. The estimated cost to complete construction work in this area was \$2,300 for labor and materials, indicating a slight "over-run" of approximately \$9,365. Temporary electric lines, amounting to \$10,000, were left in place at the close of construction at the request of Clinton Laboratories. These were transferred to permanent construction accounts and have been included in the total expenditure for the 500 Area.

\$958,398 was expended through this report period for the construction of the 600 Area against an estimated \$1,079,930. The estimated cost for labor and materials to complete construction work in this area was \$6,110, indicating an "under-run" of approximately \$115,422. Certain temporary construction facilities such as Temporary Parking Lot, Temporary Boiler and Facilities, Temporary Water Lines & Sewers, amounting to \$7,282, were left in place at the close of construction as requested by Clinton Laboratories. These facilities were transferred to permanent construction accounts and have been included in the above total expenditure for the 600 Area.

[REDACTED]

The total cost for the construction of the 700 Area through this report period was \$2,178,757, against an estimate of \$2,221,540. The estimated cost to complete construction work in this area was \$78,201 for labor and material, indicating an "over-run" of approximately \$33,418. 23 temporary construction buildings, amounting to \$164,419, were left standing at the close of construction at the request of the plant operators. These buildings were transferred to permanent construction accounts and have been included in the above total expenditure for the 700 Area.

The February Cost Report shows an expenditure of \$818,515 for the construction of the 800 Area against an estimate of \$862,760. The estimated cost to complete construction work in this area was \$3,840, for labor and materials, indicating an "under-run" of approximately \$40,405.

The actual expenditure for site work, general grading, extra machinery, and landscaping through this report period was \$138,115 against an estimate of \$52,152, indicating an "over-run" at the present time of \$85,963. The estimate, however, is incomplete for extra machinery as the KM Estimate has been included under Equipment Accounts in areas.

(b) Construction Facilities Accounts

At the end of the February report period, a total of \$269,487 was charged to Construction Facilities against an estimated cost of \$724,900. It was estimated at this time that the charge would further be reduced by approximately \$78,000 due to the transfer from this project of the remaining major equipment and small tools, thus indicating an "under-run" of approximately \$433,413. The transfer of temporary construction buildings amounting to \$145,492, major equipment, and small tools was responsible for such an "under-run". This is further reflected by the fact that at one time \$371,078 was charged to Temporary Construction against the present total of \$220,607 and a peak expenditure of \$245,642 for major equipment against the present total of \$60,784. A peak expenditure of \$154,336 for small tools was indicated by the August Cost Report but has been reduced to a present total of \$56,743.

(c) Engineering Overhead Accounts

The Engineering Overhead Accounts are separated into four groups: Engineering Design, Engineering Supervision, Field Supervision, and Field Expense. The latter two are further subdivided as shown on sheet 2 of the included Monthly Cost Report for Project 9733. To date, a total of \$1,854,629 has been charged to the Engineering Overhead Account against an estimate of \$1,704,190.

2. Project 58

The February Monthly Cost Report for Project 58 carried the original cost estimate figures. The total expenditures

by du Pont and the Government up to this period were \$279,169. It was estimated that \$14,600 for labor and \$8,650 for material, totaling \$22,650, would be required to complete this project. By using these estimated figures, the indicated total cost for Project 58 would be \$301,819, an "under-run" of approximately \$73,181. The total expenditures by du Pont up through this report period were \$235,569, and materials furnished and paid for direct by the government were \$38,357. Materials and equipment valued at \$5,454 were furnished by the Government without charge. Of this amount, \$191 of material was transferred to another government project without suballotment.

(a) General Construction Accounts

Included in the General Construction Accounts are extra machinery, 300 Area, and pertinent 500 & 600 Area Facilities in connection with the 300 Area. A total of \$211,415 was expended through this report period for the construction of the 300 Area, estimated at \$322,260. An estimate of \$15,000 for labor and material was made to complete construction work in this area, indicating an "under-run" of approximately \$95,845. The building structure and facilities, amounting to \$24,000, were left in place at the close of construction at the request of Clinton Laboratories. These were transferred to permanent construction accounts and the 300 Area has been credited for this amount.

(b) Engineering Overhead Accounts

Included in the Engineering Overhead Accounts are Engineering Design, Engineering Supervision, Field Supervision, and Field Expense. A total of \$65,410 was charged to these accounts up through this report period against the original estimate of \$60,240. It was estimated at this time that \$7,650 would be required for labor and material chargeable to these accounts to complete this project, indicating an "over-run" of approximately \$12,820.

C "Over-runs" and Additional Costs

Additional work was encountered in the construction of Projects 9733 and 58 due to field conditions and revisions in design which were never covered by additional estimates. In many cases, these were responsible for "over-runs". The actual expenditures for these revisions and additions are not known but the larger ones can be thoroughly evaluated and are as follows:

100 Area

1 wood frame Temporary Storage Building, 30' x 90', was constructed and charged to the 101 Building after revisions which had been made to the estimate for Project 9733. A large quantity of hand backfill for floor slabs in the 105

Building overran the estimate for building construction. The change in design from a 30,000 CFM exhaust fan to a larger fan and motor increased and was largely responsible for the "over-run" of the equipment cost for the 115 Building.

200 Area

Changes in equipment arrangement and the addition of new equipment increased both the building and equipment cost for Building 204. Numerous design changes were responsible for a large "over-run" in the purchase and installation of equipment for the 205 Building.

The "over-run" shown for 206 equipment is due to the addition of tank linings for the six 50' tanks and two 25' tanks, amounting to approximately \$17,681.98, and is not included in the present estimate.

300 Area

Experimental work in addition to that originally anticipated was performed and charged to the original estimate which was sufficiently high to still reflect an "under-run" for 300 Area.

500 Area

The "over-run" shown for the 500 Area is due to the transfer of \$10,000 from the TC-15 Temporary Electric Lines to the permanent account Building 501.

600 Area

Additional fences for the 105-E and 206 Areas were not included in the present estimate as well as the cost for blasting post holes. Interceptor drainage ditches were required due to local terrain, increasing construction cost for 612. Additional estimates were not made for the increase in size of steam mains and the latter estimate for additional 700 Area buildings and additions was not sufficient to cover the amount of work involved. The actual construction cost for sanitary sewers was much higher than estimated but an adjustment was not made in the estimate as sufficient funds had been allowed for process sewers to compensate for this difference.

700 Area

The original estimate for Building 703 was sufficiently high; therefore, no additional estimate was made for the First Increase. However, at this time, an "over-run" is reflected but this is due to the transfer of Buildings TC-58 and 59 in the amount of \$70,818 to Permanent Construction Accounts. Building 706-A was originally estimated to be a two-story structure instead of a single story as constructed, thereby

reflecting an "over-run" for the building structure as shown on this cost report. The increased construction cost for the 708 Addition was due to piece-meal construction as this building was in continuous operation. The large "over-run" indicated in this report for 713 Building was due to the transfer of \$26,725 from Temporary Construction Accounts to this account. The construction of Building 713-B was not included in the estimate. The original estimate for Building 714 was for a wood platform instead of a concrete as constructed, thereby increasing the cost of this structure. The "over-run" for 717-B is due to the transfer of \$47,810 from temporary and other permanent construction accounts to this building. Building 725 likewise showed an "over-run" due to the transfer of \$11,690 from TC-19. The Propane Gas Service Lines for Building 728 were changed from overhead to underground after the work was approximately 25% complete, reflecting an increased construction cost. Hand rock excavation was required for 735 Building foundations, increasing the building construction cost.

800 Area

Deep foundation work, revisions, and additions for Building 801 increased building construction cost approximately the same amount as the indicated "over-run".

Miscellaneous

Additional costs amounting to \$45,970, chargeable to Field Expense, was involved in the recruitment of labor for this project.

I. MISCELLANEOUS

A Weather Report

The United States Department of Commerce maintained a weather bureau at the Knoxville Municipal Airport at Alcoa, Tennessee. This station was located approximately 35 miles from the construction site and therefore its records did not truly represent weather conditions at the Project site but were representative of the vicinity. Official data has been collected for a period of 72 years. The department publishes an annual Meteorological Summary with comparative data and a Monthly Meteorological Summary. From this data, graphs were prepared showing the normal and accumulative precipitation during the year 1943 and January and February of 1944, which are shown on page 484. Graphs were also prepared of normal temperatures, daily temperature ranges and the relative humidity ranges which are shown on page .

Precipitation was of prime importance due to the nature of the soil in the vicinity of the plant, the top soil being a layer of clay over shale and rock. A tabulation follows which indicates the precipitation frequency, that is, the number of days each month on which rainfall was recorded. Also tabulated are the number of days each month that rainfall was recorded as a "trace". Normal and actual accumulated precipitation is also shown by months. It is to be noted that the rainfall for the whole year 1943, was sub-normal and that the accumulated deficiency was approximately 3 inches although if only the construction period of the year 1943, beginning February 1, is considered the rainfall throughout the remainder of the year was approximately normal. It should be noted that the months of February, March, July, September and October of 1943 and February of 1944 exceeded the normal precipitation of the respective month.

The actual precipitation for the month of July, 1943, was 9.29 inches and the normal for that month was only 4.36 inches. This amount of precipitation fell on 21 days of the month and on only three of these days was the precipitation recorded as a "trace".

<u>Year</u>	<u>Month</u>	<u>Days Rainfall Recorded</u>	<u>Days Recorded as Trace</u>	<u>Normal Rainfall</u>	<u>Actual</u>
1943	Jan.	18	9	4.66	2.09
	Feb.	15	7	4.51	4.83
	March	17	3	5.05	3.17
	April	18	7	4.14	3.40
	May	14	6	3.75	2.88
	June	18	4	4.10	3.26
	July	21	3	4.36	9.29
	Aug.	13	4	3.92	1.48
	Sept.	11	2	2.63	3.51
	Oct.	9	3	2.62	3.70

INCHES

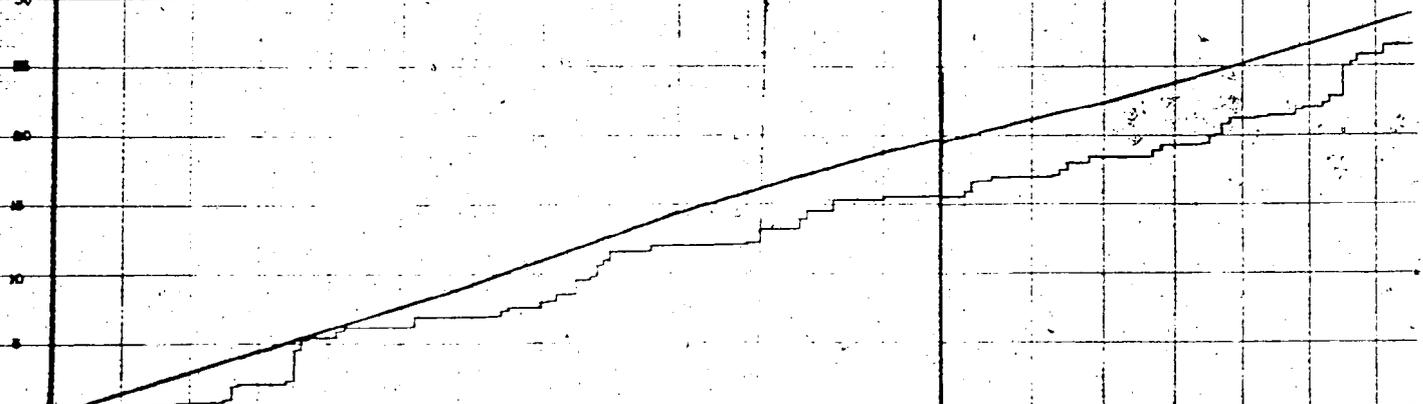
LEGEND
- ACTUAL ACCUMULATIVE PRECIPITATION 1943
- NORMAL ACCUMULATIVE PRECIPITATION

NOTE: DATA FROM WEATHER BUREAU - KNOXVILLE MUNICIPAL AIRPORT, ALCOA, TENNESSEE

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY

1943

CLINTON ENGINEER WO
PROJECT 9733
- PRECIPITATION CHART





20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY
1944

RKS

1944	Nov.	7	2	3.07	3.93
	Dec.	13	7	4.52	3.38
	Jan.	13	4	4.66	2.05
	Feb.	21	7	4.57	9.38

It should be noted that the minimum normal temperature occurs in January and is approximately 37 degrees. The maximum normal occurs in July and is approximately 78 degrees. The first temperatures below 32° F. during the construction work occurred on October 13, 1943 although it was not until November 10, 1943, that the temperature consistently fell below freezing. This condition existed until February 16, 1944. On only nine days during the construction period did the temperatures remain below freezing throughout the day. The lowest temperature of the winter of 1943-44 occurred on March 4, 1943 when a low of approximately 9 degrees was recorded.

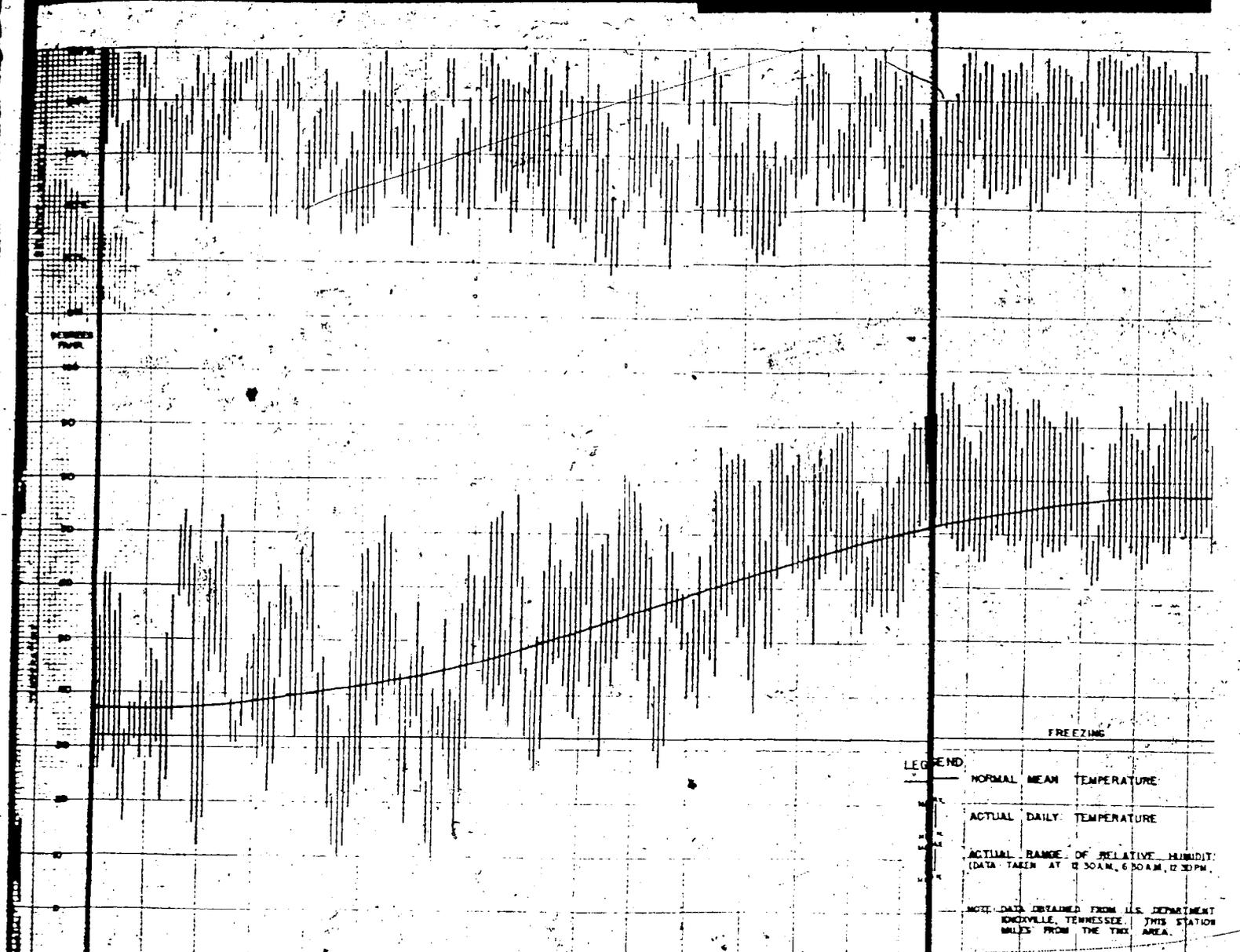
During the winter of 1943 - 44, the low temperature of 12 degrees was recorded on February 13, 1944. The maximum temperature of 101 degrees was reached on August 27, 1943.

The average daily temperatures remained above normal for most of the months of the construction period. The following tabulation shows the monthly average departure above or below normal:

YEAR	Month	Average Daily Temperature	
		Departure Plus	Departure Minus
1943	Jan.	4.5	
	Feb.	1.3	
	March		1.3
	April		0.3
	May	3.0	
	June	6.1	
	July	1.3	
	August	3.6	
	Sept.		1.4
	Oct.		1.7
1944	Nov.	0.5	
	Dec.	0.7	
	Jan.	3.5	
	Feb.	2.7	

A chart titled "Daily Temperature and Relative Humidity" shows the daily temperature and relative humidity ranges are shown. Relative humidity data was obtained from readings made at 12:30 a.m., 6:30 a.m., 12:30 p.m., and 6:30 p.m., central standard time. Equipment was not available at the weather bureau for determining the absolute maximum and minimum relative humidities. The maximum and minimum readings of the four periods at which data was taken are shown on the chart.

It should be noted that during the months of June through October the relative humidity was, in general, over 80%. These high



FREEZING

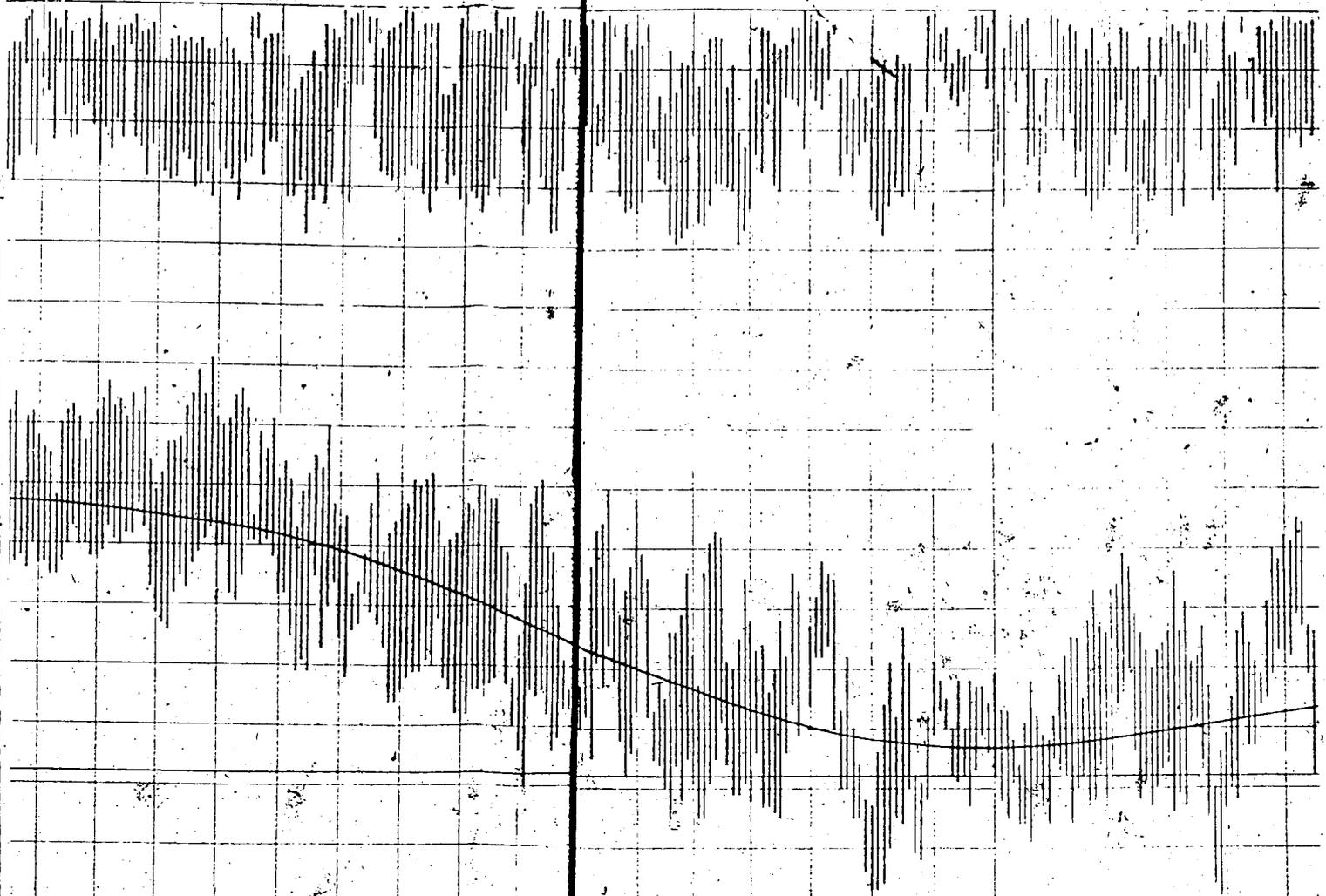
LEGEND
 ——— NORMAL MEAN TEMPERATURE
 - - - - ACTUAL DAILY TEMPERATURE
 [] ACTUAL RANGE OF RELATIVE HUMIDITY
 (DATA TAKEN AT 8:30AM, 6:30AM, 12:30PM)

NOTE: DATA OBTAINED FROM U.S. DEPARTMENT
 OF AGRICULTURE, WASHINGTON, D.C. THIS STATION
 IS 10 MILES FROM THE TRNG AREA.

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY

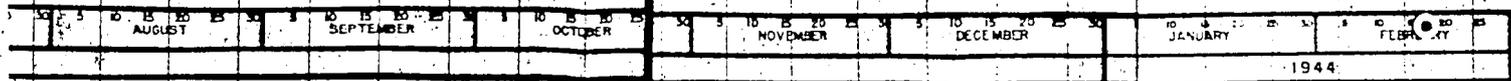
1943

CLINTON ENGINEER WORKS
 PROJECT 9733
 DAILY TEMPERATURE & RELATIVE HUMIDITY



AND 6:30PM C.S.T.

OF COMMERCE WEATHER BUREAU
IS LOCATED APPROXIMATELY 30



humidities together with the high temperatures reached during that period provided working conditions which were not conducive to obtaining good work efficiency.