PROJECT TITLE:	**SOLAR PANELS ON HUDSON COUNTY FACILITIES**
DOE AWARD NUMBER:	**DE-EE0003196**
RECIPIENT:	**COUNTY OF HUDSON**
PROJECT DIRECTOR:	**KEVIN BARRY**
TEAM MEMBERS:	**DEMETRIO ARENCIBIA, COUNTY ENGINEER** **JOHN DELUTIS, PROJECT MANAGER** **HAROLD E. DEMELLIER, JR., DIRECTOR, ROADS AND PUBLIC PROPERTY** **CHERYL FULLER, CHIEF FINANCIAL OFFICER** **JOHN GOMEZ, HISTORIC PRESERVATION NETWORK** **ROBERT YANNAZZO, CHIEF ARCHITECT** **DOBCO, INC., GENERAL CONTRACTOR** **MAST, CONSTRUCTION MANAGER** **MUSIAL GROUP, PA, ARCHITECT**

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EXECUTIVE SUMMARY

The project involved the installation of an 83 kW grid-connected photovoltaic system tied into the energy management system of Hudson County's new 60,000 square foot Emergency Operations and Command Center and staff offices. The building will be used by the Hudson County Office of Emergency Management and the Hudson County Correctional Center and will also serve as a storage facility for the Department of Corrections and the Hudson County Prosecutor.

The Hudson County Emergency Operations Center was dedicated the "U.S.S. Juneau Memorial Center" on November 13, 2013 in memory of the World War II destroyer of the same name that was built on the site.

Satellite images of U.S.S. Juneau Memorial Center prior to renovation. Before installation of solar equipment, the entire roof and the electrical system were replaced.

Satellite images of Solar Panel Installation at U.S.S Juneau Memorial Center, Kearny, NJ

Substantial completion of Solar Panel Installation at U.S.S Juneau Memorial Center, Kearny, NJ

Installation of 364 Sharp ND-U230Q1 photovoltaic panels on roof of Hudson County Juneau Memorial Center

1) INTRODUCTION

The project site is a 3.85 acre warehouse building in an industrial section of Kearny, New Jersey. The building was part of the Federal Shipbuilding and Drydock Company, which operated on over 250 acres from 1917 to 1949. The site was taken over by the United States government and granted to the County of Hudson in 1989.

In 2010, the County of Hudson awarded a contract to Dobco, Inc., of Wayne, NJ to renovate the building, incorporating various renewable energy systems, including photovoltaic panels. Other renewable components include geothermal heating and cooling, natural daylighting, natural ventilation, a gray water plumbing system, a 15 kW wind turbine and a green roof. The County intends to seek Silver LEED certification for the facility.

2) SYSTEM PERFORMANCE

The fixed-tilt roof mounted photovoltaic system is estimated to provide approximately 12% of the building's electrical energy needs. The system includes 364 Sharp ND-U230Q1 photovoltaic panels, each with a maximum power of 230 watts, 30.0 maximum volts and a maximum current of 7.57 amps. According to the manufacturer, the module efficiency is 14.1%. The Array Tilt is 12.0^{o} and the Array Azimuth is 303.0^{o}.

According to PVWATTS^{TM}, the system is estimated to produce 81,461 kWh's/year. At a grid-connected electricity cost of $0.132/kWh, the system will save Hudson County $10,770.77/year (see Table 1).

The equipment is warrantied for 25 years and is qualified as "American goods" under the "Buy American" clause of the American Recovery and Reinvestment Act" (ARRA). Additional information on the Sharp ND-U230Q1 solar panel can be accessed at:

http://www.thatsolarplace.ca/uploads/6/7/6/8/6768803/sharp_ndu230q1.pdf

According to the Environmental Protection Agency, 81,461 kWh's/year generated by solar energy will reduce Carbon Dioxide (CO2) production by 123,820.72 pounds/year, Sulfur Dioxide (SO2) by 529.5 pounds/year and Nitrogen Oxides (NOx) production by 228.1 pounds/year. CO2 is a Greenhouse Gas, SO2 contributes to acid rain formation and NOx contributes to the atmosphere ozone formation (smog) and estuarial damage. The reduction of pollution from this solar installation is equivalent to planting 24 acres of trees every year or the elimination of 11 passenger vehicles from our roads every year.

The inverter is an ADVANCED ENERGY model AE 100TX, rated output of 100kW with a power factor range of 0.95 – 1.00%. It operates at 295 – 600 Volts dc and a maximum of 340 DC amps. The DC to AC conversion is 77%. This includes losses from the inverter, solar panels and wires. The manufacturer's data sheet can be downloaded at:

http://solarenergy.advanced-energy.com/upload/File/AE_Data_Sheets/ENG-AE75-100TX-250-07_Web.pdf

Advanced Energy AE 100TX Three-phase Inverter installed at U.S.S Juneau Memorial Center, Kearny, NJ

Table 1. Performance Data for Fixed Tilt PV Installation at 110 South Hackensack Avenue, Kearny, NJ

AC Energy & Cost Savings

Station Identification	
Cell ID:	0268370
State:	New Jersey
Latitude:	40.9 ° N
Longitude:	74.2 ° W
PV System Specifications	
DC Rating:	84.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	64.7 kW
Array Type:	Fixed Tilt
Array Tilt:	12.0 °
Array Azimuth:	303.0 °
Energy Specifications	
Cost of Electricity:	13.2 ¢/kWh

Results			
Month	Solar Radiation ($kWh/m^2/day$)	AC Energy (kWh)	Energy Value ($)
1	1.57	2738	362.02
2	2.38	4117	544.35
3	3.79	7384	976.31
4	4.62	8581	1134.58
5	5.62	10629	1405.37
6	6.15	10954	1448.34
7	5.66	10210	1349.97
8	4.95	8943	1182.44
9	4.15	7337	970.10
10	2.91	5291	699.58
11	1.75	2899	383.31
12	1.41	2378	314.42
Year	3.75	81461	10770.77

3. ECONOMIC AND SOCIETIAL BENEFITS

The County retained the services of Greener by Design, an environment asset manager ™ and energy investment company to analyze various funding options for the solar installation. See Appendix IV. The conclusion was that if the County had sufficient capital resources, outright ownership of the equipment would be most advantageous. The conclusion was based on several factors, including avoided electric purchases, reduced peak rates and solar renewable energy credits (SRECS).

Hudson County, as well as most of the rest of New Jersey, is classified a non-attainment area as a result of exceeding the National Ambient Air Quality Standards for ozone and carbon monoxide. The installation of solar equipment in this highly industrialized region benefits both the environment and human health by reducing harmful emissions from the use of fossil fuels. Renewable energy also reduces peak electrical demand, helping to stabilize the grid and provides the County with electricity price stability. Solar equipment also helps reduce our nation's reliance on foreign energy supplies.

Another outcome of this project will be greater public understanding of the benefits of renewable technologies, including solar equipment. The County intends to post energy production and consumption data for the operation of the U.S.S. Juneau Memorial Center on the County's website www.hudsoncountynj.org

The solar equipment and related building renovations project cost $1,310,260, of which $500,000 is funded through the Energy and Water Development and Related Agencies Appropriations Act of 2010. The entire building renovation project totaled $29.5 million.

Other sustainable aspects of the building renovation include the installation of a 15 kW wind turbine, a geothermal heating with radiant floor heating system, natural ventilation, daylighting, a green roof, and a gray water re-use and storm water management system. Hudson County is seeking Silver LEED status for this project.

As a condition of grant approval, the New Jersey State Historic Preservation Office recommended that Hudson County prepare a research report to document the history, significance and historic buildings of the Federal Shipbuilding and Dry Dock Company, the former owner of the building and adjacent properties. Hudson County retained the services of Historic Preservation Network, P.O. Box 20084, London Terrace Station, NY, NY 10011 for this undertaking. This research was performed in conformance with the guidelines of the Historic American Engineering Record (HAER) standards and guidelines. A copy of the final report accompanies this document. The final report will be distributed in print and electronic media to the public and to libraries throughout Hudson County.

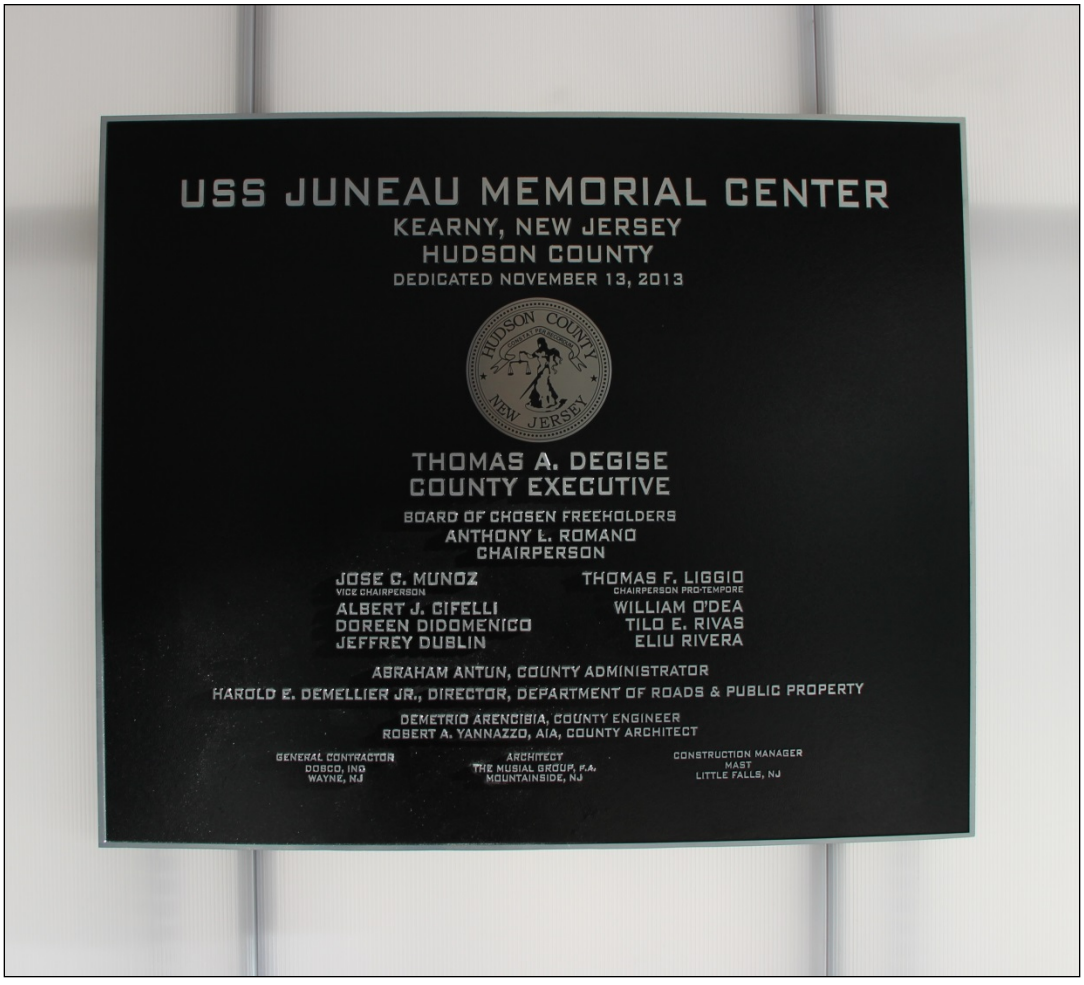
SUPERSTORM SANDY

On October 29, 2012, approximately one week before the November 6, 2012 completion date of the U.S.S. Juneau Center, the region was devastated by Superstorm Sandy. Although the occupied space had been raised one foot above the one hundred year flood plain during the renovation project, storm surges of fourteen feet (14') inundated the entire Kearny Point area on which the site is located. Water levels reached two feet, eight inches (2'8") above the finished floor within the entire building. The building suffered damages of $3.2 million, and set the project back eight months. Approximately one dozen solar panels on the roof were lost due to wind damage, and the entire electrical system, including the

inverter, was destroyed. Design modifications were implemented to mitigate future storm damages, including the elevation of all electrical components on a platform approximately 20 feet (20') above ground level. None of the expenses related to Superstorm Sandy repairs were incorporated into the project budget.

PROJECT DEDICATION

One of the most famous ships built at the Federal Shipyard and Dry Dock Company of Kearny, NJ was the U.S.S. Juneau, commissioned in 1941. It was sunk in the naval battle of Guadalcanal in the South Pacific on November 13, 1942 with a loss of 687 servicemen, including five brothers from Iowa made famous in the film "The Fighting Sullivans." Also aboard were twenty sailors from Hudson County. In their memory, Hudson County dedicated the building "THE U.S.S. JUNEAU MEMORIAL CENTER" on November 13, 2013, the 71st Anniversary of the ship's sinking.



Juneau Memorial Center Dedication Plaque

U.S.S. Juneau Memorial Center, 110 Hackensack Avenue, Kearny, NJ


NUTLEY 07110
BELLEVILLE 07109
NORTH ARLINGTON 07031
LYNDHURST 07070
EAST RUTHERFORD 07073
MEADOWLANDS SPORTS COMPLEX
MEADOWLANDS RACE TRACK
GIANTS STADIUM
CONTINENTAL AIRLINES ARENA
CARLSTADT 07072
07657
FAIRVIEW 07022
CLIFFSIDE PARK 07010
NORTH BERGEN 07047
EDGEWATER 07020
HACKENSACK RIVER
SECAUCUS 07094
07047
GUTTENBERG 07093
HUDSON POINT
ROC HARBOR
WEST NEW YORK 07093
WEEHAWKEN 07086
PORT IMPERIAL
HARMON COVE
SAW MILL MUD FLATS
SAW MILL CREEK WILDLIFE MANAGEMENT AREA
07104
KEARNY 07032
ARLINGTON MEMORIAL PARK
KEARNY PLAYGROUND
KEARNY FRESHWATER MARSH
PASSAIC RIVER
NORTH BERGEN 07047
JERSEY CITY 07307
SECAUCUS 07094
BULK MAIL CENTER (U.S. POSTAL SERVICE)
LAUREL HILL PARK
PUBLIC BOAT LAUNCH
SECAUCUS TRANSFER STATION
UNION CITY 07087
07086
LINCOLN HARBOR
WEEHAWKEN COVE
HOBOKEN 07030
EAST NEWARK 07029
HARRISON 07029
HUDSON - RIVER
MANHATTAN
HUDSON COUNTY
ESSEX COUNTY
NEWARK 07102
07105
KEARNY 07032
07306
07310
NEWPORT
JERSEY CITY 07302
HARSIMUS COVE
HARBORSIDE FINANCIAL CENTER
EXCHANGE PLACE
COLGATE
MORRIS CANAL
SITE OF U.S.S. JUNEAU MEMORIAL CENTER, FORMERLY KNOWN AS BUILIDNG 77
BUILDING #77
KEARNY POINT
NEWARK BAY
07305
JERSEY CITY 07304
LIBERTY STATE PARK
DRYERS POINT
NEWARK LIBERTY INTERNATIONAL AIRPORT
PORT NEWARK CHANNEL
07114
PORT NEWARK
ELIZABETH - CHANNEL
ELIZABETH 07201
ELIZABETH PORT AUTHORITY MARINE TERMINAL
BAYONNE 07002
PORT JERSEY & GLOBAL MARINE TERMINAL
THE PENINSULA AT BAYONNE HARBOR
GREENVILLE YARDS
LIBERTY NATIONAL GOLF COURSE (PRIVATE)
CAVEN POINT RECREATION FACILITY
PORT LIBERTE
LIBERTY ISLAND
STATUE OF LIBERTY
ELLIS ISLAND
GOVERNORS ISLAND
BUTTERMILK CHANNEL
UPPER NEW YORK BAY
EAST RIVER
BROOKLYN
CONSTABLE HOOK
CONSTABLE POINT
STATEN ISLAND
KILL VAN KULL
SHOOTERS ISLAND
BERGEN POINT
HUDSON COUNTY
RICHMOND COUNTY
KINGS COUNTY
NEW YORK COUNTY
HUDSON COUNTY & VICINITY
MORRIS COUNTY
PASSAIC COUNTY
BERGEN COUNTY
ESSEX COUNTY
HUDSON COUNTY
UNION COUNTY
MIDDLESEX COUNTY
MONMOUTH COUNTY
STATE OF NEW JERSEY
COUNTY OF HUDSON
STREET MAP 2006
Board of Chosen Freeholders
Silverio Vega, Chairman
Thomas Liggio, Vice Chairman
Doreen DiDomenico, First District
Eliu Rivera, Fourth District
Tilo Rivas, Sixth District
Jeffrey Dublin, Chair Pro Tem
William O'Dea, Second District
Maurice Fitzgibbons, Fifth District
Albert J. Cifelli, Ninth District
Thomas A. DeGise, County Executive
Mariano Vega, Jr., Director, Department of Parks, Engineering, and Planning
Stephen D. Marks, PP, AICP, Director, Division of Planning
Jonathan Luk, GIS Specialist, Division of Planning
Planning Board
Renee Bettinger, Chairwoman
Daniel Choffo, Vice Chair
Mary E. Avagliano, Commissioner
Hon. Doreen DiDomenico, Freeholder
Hon. Thomas Liggio, Freeholder
Thomas P. Calvanico, Esq., Board Attorney
Jude Fitzgibbons, Secretary
Michael A. Holloway, Commissioner
Borivoj Jasek, PE, PP, Commissioner
Rushabh Mehta, Commissioner
Stephen D. Marks, PP, AICP, Planning Director
LEGEND
INTERSTATE HIGHWAYS
U.S. AND STATE HIGHWAYS
COUNTY ROADS
MAIN AUTO ROUTES
COUNTY BRIDGES
LOCAL ROADS
RAILROADS
PATH TRAIN
HUDSON BERGEN LIGHT RAIL
STREAMS
BODIES OF WATER
07302 ZIP CODES
JERSEY CITY MUNICIPALITIES
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
COUNTY FACILITIES
COUNTY PARKS
PARKS
CEMETERIES
POINTS OF INTEREST
HOSPITALS
SCHOOLS
POST OFFICES
LIBRARIES
CITY/TOWN HALL
SCALE IN MILES
0 0.25 0.5 1 Miles
SCALE IN METERS
0 350 700 1 KM 1,400 Meters

State of New Jersey
MAIL CODE 501-04B
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NATURAL & HISTORIC RESOURCES
HISTORIC PRESERVATION OFFICE
P.O. Box 420
Trenton, NJ 08625-0420
TEL. (609) 984-0176 FAX (609) 984-0578

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

December 23, 2011

Mr. Kevin Barry
Deputy Director
Department of Roads and Public Property
County of Hudson
257 Cornelison Avenue, 7th Floor
Jersey City, New Jersey 07302

Dear Mr. Barry:

As Deputy State Historic Preservation Officer for New Jersey, in accordance with 36 CFR Part 800: Protection of Historic Properties, as published in the ***Federal Register*** on December 12, 2000 (65 FR 77725-77739) and amended on July 6, 2004 (69 FR 40544-40555), I am providing Consultation Comments for the following undertaking:

Building 77, Operations Center
Hudson County Office of Emergency Management
110 Hackensack Avenue
Town of Kearny, Hudson County, New Jersey
U.S. Department of Energy

Summary: Building 77 (former Forge Shop) is within and contributes to the significance and integrity of the National Register of Historic Places eligible **Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District**. This is a new State Historic Preservation Office (HPO) opinion of eligibility. The construction being undertaken by Hudson County at Building 77 will have an **adverse effect** on Building 77 and the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District.
Continuing consultation should focus on developing measures to mitigate the adverse effect.

800.4 Identification of Historic Properties

Building 77 is the former Forge Shop of the Federal Shipbuilding and Dry Dock Company (Federal Shipbuilding) shipyard in Kearny, Hudson County, New Jersey. The Forge Shop was constructed in 1917 and is one of the shipyard's original buildings.

The Federal Shipbuilding yard at Kearny was one of the largest shipyards erected on the Atlantic Coast during World War I. Shipyard construction began in August of 1917 and

the first vessel was launched in June of 1918. The shipyard originally occupied 170 acres and possessed 2,400 feet of Hackensack River waterfront where twelve "shipways" or "slipways" and multiple "fitting out basins" provided the space to fabricate, launch, and equip vessels. Original buildings from 1917 that remain include the Forge Shop, Boiler Shop, Foundry, Administration Building ("Talbot Hall, SHPO Opinion of Eligibility February 14, 1996), Plate Shop, Machine Shop, a "fitting out basin," and approximately 5 other small industrial buildings.

Between 1919 and 1940 the Federal Shipbuilding yard remained an active facility and in 1940, for example, the yard launched more ships than any other American shipyard. Despite this continuous activity, the facility did not substantially change until 1941.

At the beginning of 1941 the shipyard expanded by 15 acres and added another "outfitting basin," cranes, and service buildings. Among the buildings added in 1941 was a four-story reinforced concrete building, equipped with two 10 ton elevators, and a one story saw tooth roof building, equipped with two overhead cranes, both designed for the storage of supplies and heavy equipment.

In describing the 1941 expansion of the facility, newspapers reported that the shipyard had over 10,000 employees. By August of 1942 shipyard employment had grown to 15,968 employees and that number reached 17,500 three months later in October. The Kearny shipyard was also the site of significant labor-management conflict and for a short period of time was "seized" and managed by the United States Navy.

Today, the majority of the former Federal Shipbuilding site is occupied by the River Terminal Development logistics and warehouse center and warehouses have been built on the site of the Hackensack River shipways. Despite this change, most all of the World War I and II vintage buildings and the South Basin "fitting slip" and crane remain and collectively convey the historic function of the site. The boundaries of the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District are Central Avenue (west), former Central Railroad of New Jersey right-of-way (south), Hackensack River (east), and the New Jersey and National Registers of Historic Places listed Morris Canal Historic District (north).

800.5 Assessment of Adverse Effects

The construction being undertaking at Building 77 (former Forge Shop) will have an **adverse effect** upon the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District. To mitigate the adverse effect in accordance with Section 800.6 Resolution of Adverse Effects (below), the HPO recommends the preparation of a report that will document the history, significance, and historic buildings of the Federal Shipbuilding and Dry Dock Company shipyard at Kearny.

800.6 Resolving Adverse Effects

The next step after identifying historic properties and assessing effects would be consultation to resolve an adverse effect. Pursuant to 36 CFR § 800.6 (a)(1), the Federal Agency official and their designee, must notify the Advisory Council on Historic Preservation (Council) of the adverse effect finding and invite the Council to participate in the consultation. A consulting party, defined as any person or organization interested in the project and its effects on historic properties, may also request the Council to join the consultation. The Council must decide within 15 days of receipt of a request whether or not to participate in the consultation.

In order to expedite the Section 106 Review process, I have attached the "framework" for and a partially completed draft of a Memorandum of Agreement (MOA) for your information, review, and consideration. Technically, drafting the MOA is the responsibility of the Federal Agency, however, I have attached the draft MOA to assist you in developing a document that describes the measures needed to mitigate the adverse effect of the project and fulfills the requirements of Section 106.

Despite the recognized significance of the Federal Shipbuilding and Dry Dock Company Kearny Shipyard, no comprehensive history of this facility is currently available to the public. Recognizing this situation, the Historic Preservation Office suggests that the mitigation required by Section 106 should focus on documenting the Kearny Shipyard Historic District and preparing and disseminating a history of this facility. An excellent example of a comparable Pacific Coast shipyard history is found at: http://lcweb2.loc.gov/pnp/habshaer/ca/ca3300/ca3398/data/ca3398data.pdf. Although this report is considerably longer and more detailed than what might be anticipated for a history of the Kearny shipyard, it provides an excellent context and outline for researching and documenting both the history of and the surviving buildings at the Kearny shipyard. The HPO looks forward to consulting with you regarding a more detailed scope of work for documenting the history of the Federal Shipbuilding and Dry Dock Company Kearny Historic District.

If you have any questions regarding the HPO review of architectural or engineering historic properties, please contact Charles Scott of my staff at (609) 633-2396 or at Charles.Scott@dep.state.nj.us. To assist the HPO in responding to your future submissions, please note the Project Review # 12-0231 on all future correspondence.

Sincerely,

Daniel D. Saunders
Deputy State Historic
Preservation Officer

C: Yana Rasulova, U.S. Department of Energy

12-0231-1FederalShipbuildingBuilding77ForgeShopFE

MEMORANDUM OF AGREEMENT

AMONG THE

U.S. DEPARTMENT OF ENERGY, HUDSON COUNTY, AND THE

NEW JERSEY HISTORIC PRESERVATION OFFICE

REGARDING THE RENOVATION OF BUILDING 77

TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY

WHEREAS, the U. S. Department of Energy (DOE) and the Hudson County -----propose to renovate Building 77 including the installation of ?????????:

WHEREAS, the DOE has consulted with the New Jersey Historic Preservation Office (SHPO) to determine the Area of Potential Effects (APE); to identify significant, National Register eligible or listed properties; and to assess the effects of the project on those properties pursuant to the requirements of 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, Building 77 is a contributing element to the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District that is eligible for listing on the New Jersey and National Registers of Historic Place; and

WHEREAS, the County of Hudson proposes to renovate and use Building 77 to house its emergency management operations; and

WHEREAS, the SHPO determined that that the undertaking will have an adverse affect on Building 77; and

WHEREAS, DOE has consulted with interested parties and considered alternatives to the project, and determined that it is not feasible to implement alternatives involving avoidance or minimization of impacts while achieving the goal of energy efficiency; and

WHEREAS, the Advisory Council on Historic Preservation was notified of the adverse effects by a _____ [[date]] letter and has not responded to a request to participate in the consultation process within the 15 day response time;

NOW, THEREFORE, the DOE and SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties in compliance with the National Historic Preservation Act (16 U.S.C. 470).

STIPULATIONS

The DOE shall ensure that: [[HPO Note: the following text suggests a basis for further consultation regarding a final scope of work]]

1 That the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District is documented (recorded) in writing and with photographs in accordance with Historic American Engineering Record (HAER) standards and guidelines.

2 That a history of the Federal Shipbuilding and Dry Dock Company Kearny Shipyard is prepared and distributed to the public using printed and/or electronic media. The history of the Kearny Shipyard shall include a narrative account, with appropriate graphics, documenting the history of this facility and the preparer shall conduct historic research at local (municipal and county/local historic societies) and state (NJ State Museum, NJ Archives, Rutgers University Special Collections, NJHPO) libraries and archives, review historic maps and aerial photographs, prior historic property surveys, municipal deeds / tax records, industrial census data, newspapers, and engineering periodicals.

3 The recordation and history specified in 1 and 2 above shall be submitted to the HPO for review, comment, and approval within _____ [[time period]].

ADMINISTRATIVE CONDITIONS

Professional Qualifications

DOE will ensure that all work is carried out by/under the direct supervisions of a person or persons meeting at a minimum the *Secretary of the Interior's Professional Qualifications Standards for Archaeology, History and/or Architectural History* [48 FR 44738-9] as appropriate.

OTHER TERMS AND CONDITIONS

A. The policy and procedures contained within this MOA do not create any rights, either substantive or procedural, enforceable by any party regarding an enforcement action brought by the United States. Nothing in this MOA is intended to diminish, modify, or otherwise affect statutory or regulatory authorities of any of the signatory agencies.

B. Nothing in this MOA will be construed as indicating a financial commitment by the signatory agencies for the expenditure of funds except as authorized in specific appropriations.

C. Modification, amendment, or termination of this agreement, as necessary, shall be accomplished by the consulting parties in the same manner as the original agreement.

D. Disputes regarding the completion of the terms of agreement shall be resolved by the consulting parties. If the consulting parties cannot agree, then any one of the consulting parties may request the participation of the Advisory Council on Historic Preservation to assist in resolving the dispute.

E. This agreement shall be null and void if its terms are not carried out within five (5) years from the date of its execution, unless the consulting parties agree in writing to an extension.

Signatories for the Consulting Parties

U.S. Department of Energy

_____ _____

Date

New Jersey State Historic Preservation Office

_____ _____

Daniel D. Saunders, Deputy State Historic Preservation Officer Date

County of Hudson

_____ _____

Date

Preserving America's Heritage

February 27, 2012

Melissa Rossiter
Environmental Protection Specialist
U.S. Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

Ref: *Proposed Renovation of Building 77 (former Forge Shop)*
Town of Kearny, Hudson County, New Jersey

Dear Ms. Rossiter:

On February 15, 2012, the Advisory Council on Historic Preservation (ACHP) received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and it is determined that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the New Jersey State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the notification of adverse effect. If you have any questions or require further assistance, please contact Mr. Lee Webb at (202) 606-8583 or at lwebb@achp.gov.

Sincerely,

LaShavio Johnson

LaShavio Johnson
Historic Preservation Technician
Office of Federal Agency Programs

Greener by Design

Date: 2/7/10
Re: Hudson County Solar Project

Per your request, GbD did a basic analysis of the current solar market and a comparison between Power Purchase Agreement (PPA) funding and self-funding in terms of return on investment (roi) or internal rate of return (irr) for the County.

In looking at market conditions such as cost of capital, current solar renewable energy market (SREC), energy prices, congestion load of the region and a variety of other factors, **Greener by Design has determined that Self Ownership has the highest profit margin for the County if sufficient capital is available.**

Comparison:

Standard Power Purchase Agreement: A standard PPA model based on January 2010 can be offered in two ways. First, an entity could identify the total square footage available to place solar panels on. This entity would likely lease the roof space from the County and offer a discounted electric rate compared to the current retail rate. In return the PPA would get a long term contract to sell discounted solar power to the County, would keep all SREC's and would keep all tax advantages, including the ITC of 30% (which is a Cash back deal for the remainder of 2010).

The PPA may offer some variety to this standard that might include a partial split of SREC revenue, some cash back out of the deal if the County would be willing to pay a higher price of electricity and they may offer some additional revenue splits if they are negotiated.

The average return to the County for a PPA would be a 15% savings on electric for the site that the panels are located on and some revenue from leasing space and partial SREC revenue. Average ROI is 7% in a PPA deal

Advantage:

- No initial outlay of capital for the County to purchase the panels
- No risk since the County will not put any money out
- Discounted electric rates
- Green energy production

Disadvantages:

- Very small return on investment.
- No SRECs, which can have substantial value
- Electric rates will still be high relative to owning the system outright since you are only getting a discounted rate
- Long term contract

Self-Ownership: By purchasing the solar array outright, the County can expect 4 major sources of revenue.

1. Reduced Electric – By owning the panels, the location where they are located can expect a reduced electric and peak electric rate that should average about 50% savings (depending on day time electric load of the building and size of the array). This avoided electric cost is calculated at the retail rate of electricity (avg. .14 per kwh) and thus helps to produced a significant avoided electric cost.
2. Solar Renewable Energy Credits (SREC) – Recent changes in the law have given a big boost to the SREC market and will create a short term run up in prices. This, combined with the ability to sell SREC's on a contract basis, makes them the highest payback element of the solar investment. Current SREC prices are in the $650 range (.65 per kwh or 4.5 * the price you are getting for the electric).
3. ITC – 30% one time cash back bonus. This will be received in cash to the County within 30 days of the system going live.
4. Depreciation – an advanced depreciation schedule that allows for an 85% write down over 5 years. (Note: county may not be able to take advantage due to its tax status)

These factors create a market where the average ROI for solar arrays in New Jersey that are self owned at approximately 18% to 22%. Depending on the cost of capital, the advantages of self-ownership give you a much higher rate of return and long-term profit margin.

Advantages:

- Large discounted electric costs
- SREC revenue and ability to cut long term contracts
- ITC cash back pays for %30 of the cost
- Long-term profit margin is very good and will allow the County to control its system.

Disadvantages:

- Cost – the County must put out the money to buy the system
- Risk – there is some risk that long term SREC prices come down and thus the overall ROI comes down

Sample Solar Proposals for Self-Ownership:

Vendor	KWH size	$/Watt for installation	Total Cost	IRR	Payback	SREC value in Yr 1
A	1,100	5.00	$5,500,000	23	3.2 years	$750,000
B	1,100	5.10	$5,610,000	22	3.4 years	$690,000
C	1,100	4.90	$5,390,000	24	2.9 years	$815,000

COUNTY OF HUDSON, NEW JERSEY
OFFICE OF THE COUNTY COUNSEL
DEPARTMENT OF LAW
ADMINISTRATION BUILDING ANNEX
567 PAVONIA AVENUE
JERSEY CITY, NJ 07306
(201) 795-6250
Fax: (201) 795-6428

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COUNTY EXECUTIVE

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John Collins
Daniel DeSalvo
Kathleen Grant
Susan McCurrie
Elizabeth McNamara
Robin Moses
Chanima Odoms
Robert J. Pompliano
Daniel W. Sexton
John Smith, III
Radames Velazquez, Jr.

October 1, 2012

Daniel Saunders, Deputy SHPO
State of New Jersey
Department of Environmental Protection
Historic Preservation Office
P.O. Box 420
Trenton, New Jersey 08625

Re: Memorandum of Agreement
Renovations of Building 77, Town of Kearny
Hudson County, New Jersey

Dear Mr. Saunders:

Enclosed for your signature please find thee (3) original Memorandum of Agreement as it relates to the above-captioned matter.

Please sign and forward to Melissa Ardis, Environmental Protection Specialist.

Very truly yours,

DONATO J. BATTISTA
HUDSON COUNTY COUNSEL

BY: _____
DANIEL J. DeSALVO
ASSISTANT COUNTY COUNSEL

DJD/ek

MEMORANDUM

TO: Thomas DeGise, County Executive and Daniel D. Saunders, Deputy State Historic Preservation Officer, New Jersey

CC: Yana Rasulova, DOE PO

FROM: Melissa Ardis, Environmental Protection Specialist

DATE: September 11, 2012

RE: Renovation of Bldg 77, Town of Kearny, Hudson County, New Jersey

---

Dear Mr. DeGise and Mr. Saunders:

Enclosed please find three (3) originals of the Memorandum of Agreement in the above-referenced matter.

Mr. DeGise - please sign all 3 originals and forward them to Daniel Saunders at the New Jersey State Historic Preservation Office.

Mr. Saunders - please sign all 3 originals and return the originals to me in the enclosed envelope.

I have provided pre-addressed envelopes for everyone's convenience.

I will coordinate signature with Minh Le and will distribute an completed copy to all signatories.

I will also provide the ACHP with a copy, which must occur prior to approving the undertaking.

Please do not hesitate to contact me with any questions.

Sincerely,

Melissa Ardis
Environmental Protection Specialist
U.S. Department of Energy
1617 Cole Blvd.
Golden, CO 80401
720-356-1566
melissa.rossiter@go.doe.gov

MEMORANDUM OF AGREEMENT

A MEMORANDUM OF AGREEMENT AMONG THE UNITED STATES DEPARTMENT OF ENERGY, HUDSON COUNTY, AND THE NEW JERSEY STATE HISTORIC PRESERVATION OFFICE REGARDING THE RENOVATION OF BUILDING 77 TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY

WHEREAS, the United States Department of Energy (DOE) administers the following financial assistance programs: 2010 Congressionally Directed Energy Efficiency and Renewable Energy Project funded by Omnibus Appropriations Act 2009

WHEREAS, the DOE has determined that projects funded by the Program are undertakings subject to review under Section 106 of the National Historic Preservation Act, 16 U.S.C 470f (NHPA) and its implementing regulations at 36 CFR part 800 (undertakings); and

WHEREAS, Hudson County is receiving financial assistance from DOE from the Solar Energy Technologies Program; and

WHEREAS, Hudson County proposes to install an 83 kW roof-mounted photovoltaic system with monitoring equipment on the Hudson County Emergency Operations Center (EOC) at 110 South Hackensack Avenue, Kearny, NJ. This is part of a larger effort to utilize renewable energy in the building, including the installation of three 20 kW wind turbines, geothermal heating with radiant floor heating, natural ventilation and daylighting, a green roof, a gray water re-use system and storm water management system, and other energy conserving technologies; and

WHEREAS, Hudson County, in consultation with the SHPO, has determined that the Area of Potential Effects (APE) for this undertaking are the boundaries of the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District, which are Central Avenue to the west, former Central Railroad of New Jersey right-of-way to the south, Hackensack River to the east, and the Morris Canal Historic District to the north, as shown on the attached map (Attachment **A**), and

WHEREAS, Building 77 is a contributing element to the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District that is eligible for listing on the New Jersey and National Registers of Historic Place; and

WHEREAS, Hudson County, in consultation with the SHPO has determined that the undertaking will have an adverse effect on Building 77 and has notified DOE of the adverse effect; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1), DOE has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

WHEREAS, the DOE has invited Hudson County to participate in this consultation and to sign this Agreement as an invited signatory and Hudson County has elected to participate; and

NOW THEREFORE, in order to satisfy the DOE's Section 106 responsibilities to take into account the effects of the undertaking on historic properties, the DOE and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations:

STIPULATIONS

The Department of Energy, in cooperation with Hudson County, shall ensure that the following stipulations are met:

1 That the Federal Shipbuilding and Dry Dock Company Kearny Shipyard Historic District is documented (recorded) in writing and with photographs in accordance with Historic American Engineering Record (HAER) standards and guidelines.

2 That a history of the Federal Shipbuilding and Dry Dock Company Kearny Shipyard is prepared and distributed to the public using printed and/or electronic media. The history of the Kearny Shipyard shall include a narrative account, with appropriate graphics, documenting the history of this facility and the preparer shall conduct historic research at the following locations:

a. National Archives and Records Administration (College Park, Maryland)

Records Relating to the Federal Shipbuilding and Dry Dock Company
National Archives Identifier: 5709830
Record Group 19: Records of the Bureau of Ships
Records document the activities of the Federal Shipbuilding and Dry Dock Company between 1917 and 1947. Consists of reports, memoranda, postcards, photographs relating to the operations of the Federal Shipbuilding and Dry Dock Company in Kearny, New Jersey. Includes photographs (panoramic scenes) of the shipyard after its establishment in 1917.

b. National Archives and Records Administration (New York Regional Archive)

Record Group 80 (80.8.1): Department of the Navy
Records of the Officer-Charge, Federal Shipbuilding and Dry Dock Company, Kearny, New Jersey (11 cubic feet) Shipbuilding activities of the company while under the control of the Unites States Navy (1941-1942). Includes correspondence, clippings, tax and insurance papers, and photographs.

3 The preparer shall also conduct research at the: Kearny Museum (within the Kearny Free Public Library and the Newark Public Library. The Kearny Museum in the Kearny Free Public Library is another potentially important source of information and locating copies of The Halyard (Federal Shipbuilding publication) would most likely also yield some World War II era history and photographs (covers of The Halyard appear on-line). The Newark Public Library New Jersey Collection may also have newspaper and primary source information on the Kearny Shipyard.

4 The recordation and history specified in 1 and 2 above shall be submitted to the NJHPO for review, comment, and approval within 9 months of the date the contract is fully signed by all parties.

ADMINISTRATIVE CONDITIONS

Professional Qualifications

DOE will ensure that all work is carried out by/under the direct supervisions of a person or persons meeting at a minimum the *Secretary of the Interior's Professional Qualifications Standards for Archaeology, History and/or Architectural History* [48 FR 44738-9] as appropriate.

II. DURATION OF AGREEMENT

This Agreement will continue in full force and effect until three (3) after the date of the last signature. At any time in the three-month period prior to such date, any party to this Agreement may request the other signatory parties to consider an extension or modification of this Agreement. No extension or modification will be effective unless all parties to the Agreement have agreed with it in writing.

III. MONITORING AND REPORTING

A. Following completion of the work, Hudson County shall provide all parties to this Agreement a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in Hudson County's efforts to carry out the terms of this Agreement.

V. DISPUTE RESOLUTION

A. Should any party to this Agreement object in writing to the DOE regarding any action carried out or proposed with respect to this Agreement or to implementation of this Agreement, the DOE will consult with the objecting party to resolve the objection.

B. If after initiating such consultation, the DOE determines that the objection cannot be resolved through consultation, the DOE shall

1. Forward all documentation relevant to the dispute, including the DOE's proposed resolution, to the ACHP. The ACHP shall provide DOE with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, DOE shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP and Signatories, and provide them a copy of this written response. DOE will then proceed according to its final decision.

C. Should the ACHP not provide its advice regarding the dispute within the thirty (30) day time period, the DOE may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, DOE shall prepare a written response that takes into

account any timely comments regarding the dispute from the signatories to the MOA, and provide them and the ACHP with a copy of such written response.

D. At any time during implementation of the measures stipulated in this Agreement, should an objection pertaining to this Agreement be raised by a member of the public, the DOE shall notify the parties to this Agreement and take the objection into account, consulting with the objector and, should the objector so request, with any of the parties to this Agreement to resolve the objection.

E. It is DOE's responsibility to carry out all other actions to the terms of this MOA that are not subject of the dispute remain unchanged.

IV. AMENDMENTS

A. This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

V. TERMINATION

A. If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation IV, above. If within thirty (30) days an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

B. Termination shall include the submission of a technical report or other documentation by Hudson County on any work done up to and including the date of termination.

C. Once the MOA is terminated, and prior to work continuing on the undertaking, DOE must either (a) execute an MOA pursuant to 36 CFR 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. DOE shall notify the signatories as to the course of action it will pursue.

VI. EXECUTION OF AGREEMENT

This Agreement may be executed in counterparts, with a separate page for each signatory. The DOE will ensure that each party is provided with a copy of the fully executed Agreement.

Execution of this Memorandum of Agreement by the DOE and the SHPO and its submission to the ACHP in accordance with 36 CFR 800.6(b)(1)(iv), shall, pursuant to 36 CFR 800.6(c), be considered to be an agreement pursuant to the regulations issued by the ACHP for the purposes of Section 110(l) of the NHPA. Execution, submission, and implementation of the terms of this Agreement, demonstrates that the DOE has afforded the ACHP an opportunity to comment on the proposed undertaking and its effect on historic properties, and that the DOE has taken into account the effect of the undertaking on historic properties.

VII. ANTI-DEFICIENCY ACT ASSURANCE

This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds among or between parties to this MOA will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate agreements that shall be effected in writing."

SIGNATORIES:

UNITED STATES DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

By:_____ Date:_____
Minh Le
ACTING PROGRAM MANAGER AND CHIEF ENGINEER

NEW JERSEY STATE HISTORIC PRESERVATION OFFICER

By:_____ Date:_____
Daniel D. Saunders
Deputy State Historic Preservation Officer

HUDSON COUNTY

By:_____ Date: 9-25-12
Laurie Cotter,
Deputy County Administrator

STATE OF NEW JERSEY)
: SS
COUNTY OF HUDSON)

BE IT REMEMBERED, that on this 5th day of Sept., Two Thousand and Twelve, before me, the subscriber, a _____ personally appeared ALBERTO G. SANTOS, who being by me duly sworn according to law, on his oath says that he is the Clerk of the Board of Chosen Freeholders of the County of Hudson and that LAURIE COTTER, is the Deputy County Administrator, that she knows the corporate seal of said County of Hudson and that the seal affixed to the foregoing instrument is the seal of said County; that the said LAURIE COTTER as Deputy County Administrator signed said instrument and affixed said seal thereto as her voluntary act and deed for the uses and purposes therein expressed, in attestation whereof, he the said ALBERTO G. SANTOS as Clerk, subscribed his name thereto.

ALBERTO G. SANTOS, CLERK
BOARD OF CHOSEN FREEHOLDERS

Subscribed and sworn to
before me this 5th day
of Sept.,2012

MARIA CORSO
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Feb. 19, 2013
ID Number 2108977

The Federal Shipbuilding & Drydock Co.

(1917 to 1949)

Kearny, New Jersey

Prepared 2012-2014 by

Historic Preservation Network
Post Office Box 20084
London Terrace Station
New York, NY 10011

This report was commissioned by the County of Hudson, New Jersey

to document the rich history of the

Federal Shipbuilding & Dry Dock Company, Kearny, NJ

(1917 to 1949)

THOMAS A. DEGISE

HUDSON COUNTY EXECUTIVE

HUDSON COUNTY BOARD OF CHOSEN FREEHOLDERS

Anthony L. Romano, Chairman, District 5

Jose Munoz, Vice Chairman, District 7

Thomas F. Liggio, Pro Tempore, District 8

Albert Cifelli, District 9

Doreen DiDomenico, District 1

Jeffrey Dublin, District 3

William O'Dea, District 2

Tilo E. Rivas, District 6

E. Junior Maldonado, District 4

DEPARTMENT OF ROADS AND PUBLIC PROPERTY

Harold E. Demellier, Jr., Director

Kevin Barry, Deputy Director

TABLE OF CONTENTS

Federal Shipbuilding & Drydock Company

Kearny, New Jersey

I. INTRODUCTION / SUMMARY

The Federal Shipbuilding and Drydock Company was incorporated in 1917 to build merchant ships during WWI. Founded as a subsidiary of US Steel with the American Bridge Company, the Federal Shipbuilding and Drydock Company (Federal) was one of over 100 yards that were constructed during WWI to replenish a dwindling stock of merchant ships that were destroyed by the Germans. Federal built an industrial shipbuilding city in place of marshland on Kearny Point. The shipyard was designed to build standardized pre-fabricated ships expediently during wartime and to build and repair all types of individualized merchant ships for private customers during times of peace.

The Federal Shipyard and Drydock Company maintained operations in Kearny between 1917 and 1949. During this 32 year tenure, Federal built 464 vessels of which an unprecedented 300 ships were built for the US government during WWII under its emergency shipbuilding program. By 1943, Federal employed 52,000 people, built ships faster than any other yard in the world, and was a recognized leader in new innovations in ship construction and mechanics. Famous for its construction of Navy destroyers, Federal was the Navy's "favorite" yard during WWII.

Summary of Construction (1917-1918)

- Gulf and Pacific Dredging Company - Dredging contractor.
- Fraser, Grace & Company - Built the shipways and temporary railroad tracks.
- Post & McCord - Responsible for the building foundations and the steelwork.
- American Bridge Company - Responsible for the building design, steel fabrication (off site) and material coordination. Robert Mc Donald, marine engineer, was in charge.

Alterations (WWII era)

- January 1941: Walter Kidde Contractors of New York - Built a four-story reinforced concrete storage building and an adjoining one-story saw-tooth roof building.

- February 1941: The American Bridge Company - Responsible for an addition to the mold loft.

- Prior to 1942: Construction of a new wet basin, a new double shipway, and the architecture building.

Integrity of the Site

According to recent aerial photography and maps, all of the major buildings built during WWI remain in service today and include the plate shop, machine shop, forge shop, boiler shop, and the general office building. Some of the WWI era features remain including the wet basin with crane, and railroad tracks. The 12 shipways, classification and storage yards, and some of the smaller, less significant buildings (the powerhouse, joiner shop, storage buildings, hospital, time office, pay office and barracks) do not appear to remain.

Remaining WWII era buildings and features include the saw-tooth roofed storage building, the architecture building and the second wet basin. The double shipway does not appear to remain.

Methodology

The history of the Federal Shipyard & Drydock Company was assembled by visiting the following repositories:

- The National Archives, 8601 Adelphi Road, College Park, MD 20740
- Kearny Public Library, 318 Kearny Avenue, Kearny, NJ 07032
- The Charles F. Cummings New Jersey Information Center Newark Public Library, 3rd Floor, 5 Washington Street, Newark, NJ 07102
- New Jersey Room at the Jersey City Free Public Library, 472 Jersey Avenue, Jersey City, NJ 07302
- Google Books
- Internet websites

Preparers

Historic Preservation Network
Post Office Box 20084
London Terrace Station
New York, NY 10011
Research/Editing: John Gomez, Architectural Historian
Preparer: Carla Cielo, Architectural Historian
Photographer: Andrew Doran

II. HISTORY of the FEDERAL SHIPBUILDING and DRYDOCK COMPANY

A. GEOGRAPHIC DESCRIPTION

Kearny occupies a 10.19 square mile area of Hudson County, New Jersey.[1] The Passaic River divides it from the Essex County towns of Belleville and Newark and the Hackensack River divides it from Jersey City and Secaucus. North Arlington and Bergen County are to the north, Harrison and East Newark are to the south. Kearny is 5 miles due east of Manhattan: "fortunately placed for commercial development" between the 19th century industrial centers of Newark and Jersey City and with nearly 10 miles of navigable waterfront on the Passaic and Hackensack Rivers. However, all but a strip one mile wide along the Passaic River was marshland.

1873 *Atlas of NJ Counties of Essex, Union and Hudson* showing the distinction between Kearny uplands and the meadows.

Kearny's two distinct geographical sections - the uplands and the meadows - are separated by a transitioning slope.[2] Residential development is confined to the uplands which are roughly a mile wide and a little more than 2 miles long at the western edge of the town along the Passaic River. The meadows area was tidal salt marshland throughout the 19th century. The southern portion of Kearny Meadows is a peninsula at the terminus of the Passaic and Hackensack Rivers at the confluence of the Newark Bay and is known as Kearny Point. The 1896 "*Map of the Hackensack Meadows*" shows the division between uplands and meadows with the uplands covering about 21% of the town which is roughly 2 square miles and the meadows covering the remaining 79% which is roughly 8 square miles (5,120 acres).[3] The Kearny Meadows was part of a 43 square mile ecosystem known as the Newark and Hackensack Meadows which extended from Newark to Hackensack. Today, after a century of landfilling, the wetland acreage is under 13 square miles and is known collectively as "the Meadowlands."[4]

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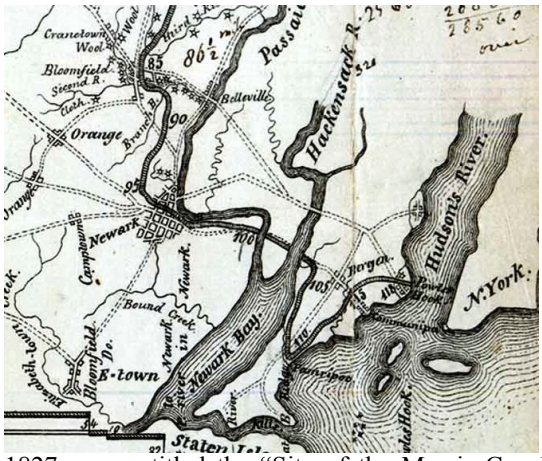
[1] "Kearny, New Jersey" http://en.wikipedia.org/wiki/Kearny,_New_Jersey; "History of the Town of Kearny" http://www.kearnynj.org/History

[2] Today, Kearny is divided into three zoning sections: Uplands, Kearny Meadows and Kearny Point (also known as South Kearny).

[3] Vermeule 1896; "History of the Town of Kearny" http://www.kearnynj.org/History

[4] Marshall, 2004

B. HISTORY OF KEARNY



1827 map entitled the "Site of the Morris Canal" showing the three roads through Kearny Meadows.

Early History

Kearny was part of a 30,000 acre land grant that was obtained by "Major William Sandford" of Barbados in 1668. The grant included the uplands and meadows between the Passaic and Hackensack rivers from Kearny Point to what is today Rutherford. It was called "New Barbados" after Sandford's homeland. In the early 1700s, Captain Arent Schuyler (1662-1730) purchased the portion of this tract that included parts of present day Kearny and North Arlington. Schuyler's family home was located in the northern portion of Kearny, known today as the Arlington section, and played a part in the Revolutionary War. It was demolished in 1924.

Prior to 1720, a vein of copper was discovered on Schuyler's land at the edge of the uplands near the present day border of Kearny in North Arlington. According to Wikipedia, the earliest shipping record for ore sent to Holland is dated 1721 making the Schulyer Copper Mine the earliest copper mine in New Jersey and one of the earliest in North America. After Schuyler's death, his sons inherited his land and continued mining operations. The mine remained in use throughout the 18th and 19th centuries, albeit with significant periods of down time.[5]

Kearny Uplands

By the mid 19th century, Schuyler's land was divided into farm tracts as was the remainder of the Kearny uplands. The division between uplands and meadows is present day Schuyler Avenue but Hopkins' 1873 map of "Part of Kearny Township" shows farm tracts on the slope down to the meadows.[6] The meadows remained entirely undeveloped. Kearny uplands was home to a few dozen produce farms in 1870, but this soon changed.

The "Township of Kearny" was created in 1867, subdividing from Harrison and named for resident and Civil War hero General Philip Kearny. In 1870, the Fuller Land Company purchased a large tract near the newly established Montclair Railroad line in the northern section of Kearny and called the area "Arlington." The Arlington passenger train station opened in 1873. The speculators marketed "cheap and rural homes," "broad avenues, handsomely graded streets

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5 "Schuyler Copper Mine" http://en.wikipedia.org/wiki/Schuyler_Copper_Mine

6 Hopkins 1873 p. 159

and plank walks" for New York City businessmen and their families. This successful venture led to the development of the Arlington section in the northern part of Kearny.[7]

Far more transformative, however, was the opening of the Clark Thread Company factory on the Passaic River at the southern end of Kearny in 1875. The Clark Mills along with the Mile End Thread Mill, which opened in 1876, and the Marshall Flax Spinning Company, which opened in 1883, attracted immigrant Scottish textile workers and initiated a working class housing boom. Kearny's population of 777 in 1880 increased 909% to 7,064 by 1890. Industries found Kearny uplands attractive because of the availability of land and its close proximity to New York City, Newark and Jersey City. Industrial sites were primarily located on the Passaic River at the south end of the uplands and on the sloped transition between the uplands and the meadows. The major industries in the early 20th century were E. I Dupont Company which manufactured plastics and the Congoleum Nairn Company which manufactured linoleum. The remainder of Kearny uplands was developed residentially with a commercial, trolley-lined shopping street in the middle. Kearny uplands experienced steady growth and development through the 1920s reaching a population of 18,659 by 1910 and 26,724 by 1920. The largest spike in population occurred between 1920 and 1930 reaching the height in 1930 of 40,716.

Kearny Meadows

Pre-industrialized commercialized activities in the meadows included fishing, hunting fowl and small mammals, and harvesting salt hay for feeding and bedding livestock. Swamp cedars were harvested in the 18th century. Dikes and drains were used to dry out wetlands to create farmland but this was on a limited scale. There were several failed attempts to reclaim large sections of wetlands.[8] The first major road through the Kearny Meadows was built from cedar logs in 1759. It led from Schulyer's home and copper mine to "Schulyer's Ferry" on the Kearny side of the Hackensack River connecting with Jersey City and aligning with what is today the "Belleville Turnpike" or Route 7. It aided in the transportation of copper ore and played a part in the Revolutionary War.[9]

Traversing Kearny Meadows was a convenient way to access Jersey City and Manhattan from Kearny uplands, Newark and other places in Essex County. The earliest bridges to cross the Hackensack and Passaic rivers were built in 1795.[10] The Morris Canal, which was completed in 1836, traversed Kearny Point along what is now Lincoln Highway (Route 1). The 1827 map entitled "Site of the Morris Canal" shows three roads through the Kearny Meadows: The "Newark Plank Road" which led from the Ironbound section of Newark to Jersey City parallel to

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[7] Krasner, 2007 p. 21

[8] Marshall, 2004; Quinn 1997 pp. 84-85

[9] Krasner, 2007 p. 103; "History of the Town of Kearny" http://www.kearnynj.org/History

[10] Winfield 1874 p. 362

the canal through Kearny Point (today's Lincoln Highway), the "Turnpike to Jersey City" from Harrison (today's Newark Turnpike), and the "Newark and Belleville Road" (which connected with the turnpike and aligned with the 1759 log road and today's Route 7).[11] These remain the main roads through the area today.

Railroads were next to traverse the meadows; the first being "the New Jersey Railroad" which was completed by 1836. The 1873 map of Hudson County shows five major rail lines traversing Kearny meadows and Kearny point, all with their terminus in Jersey City.[12] Laying track through the meadows required the creation of sophisticated berms significantly elevating the tracks above high tide. The Jersey City aqueduct, completed in 1854, transported water from the Passaic River to Jersey City through Kearny Meadows.[13] Finally, in the 20th century, three automotive highways were built: the Pulaski Skyway which opened in 1932; the New Jersey Turnpike which was built between 1950 and 1952; and Route 280 which was built in the 1960s.

Throughout the 19th and early 20th century, wetlands were largely regarded as "wastelands" that ought to be improved for sanitation and productivity. By the fourth quarter of the 19th century the state geologists recommended reclaiming the Meadowlands with dikes and dredged navigation channels. But this would leave land below sea level and would be limited to farm use. Colonel Joseph O. Wright, a federal engineer who surveyed the Newark and Hackensack meadows in 1907, reported:

> "The marsh in its present condition is not only worthless, but is a detriment to public health and a nuisance to the residents of the adjacent upland." It was "a prolific place for mosquitoes," containing sewer filth "both obnoxious and unwholesome." Wright added that even apart from "the question of sanitation," the meadows should be reclaimed. Their geographical position, "within eight miles of the city of New York and traversed by three great trunk-line railways," made the meadows "too valuable to longer remain idle."[14]

The tremendous increase in population in the urban centers of Manhattan, Jersey City and Newark between 1870 and 1900 created a demand for land. By the early 20th century, navigable waterfront land in the New York metropolitan area was limited. The Hudson River waterfront of Jersey City was almost entirely owned by railroad companies for terminals, warehousing and other purposes. Steamship companies held much of the Hoboken waterfront. North of Hoboken, the Palisades limited commercial water front development. The Standard Oil Company held

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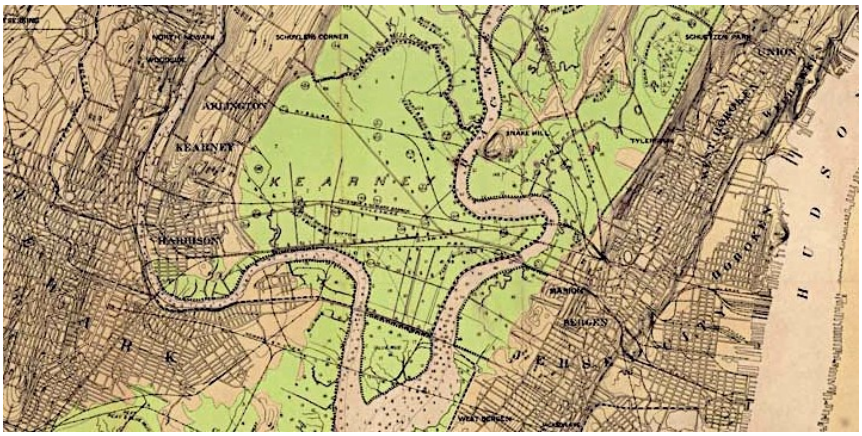
11 Imbert's Lithography 1827; Hopkins 1873

12 Gordon 1834; Hopkins 1873

13 Winfield 1874 pp. 292-3

14 Marshall, 2004



1896 Geological Survey of New Jersey *Map of the Hackensack Meadows* showing the developed sections of Newark, Kearny and Jersey City surrounding Kearny Meadows, which are shown in green.

parts of the Bayonne waterfront.[15] The Newark and Kearny Meadows (including Kearny Point) had the geographic advantage of close proximity and were undeveloped, but were only a few inches above high tide.

Early 20th century land-making projects, both private and government sponsored, used fill to permanently raise the terrain several feet above sea level to create land suitable for industrial development. In 1914, the City of Newark began filling the meadows to create Port Newark. Parts of Kearny's marsh was reclaimed by private land companies but this took many decades. Extensive dredging of the Passaic and Hackensack rivers by the US Army Corps of Engineers for shipping channels began in the late 19th and early 20th centuries and provided a source of landfill. Municipal garbage and excavation debris were other sources for fill. Landfilling in Kearny continued throughout the mid 20th century, particularly with the opening of the New Jersey Turnpike.[16]

River Dredging

In the late 19th and early 20th century, the Passaic and Hackensack Rivers acted as shipping highways serving factories along its shores. Several towns had public wharves with derricks to serve inland factories. Commerce on the rivers included building materials, "lumber from Maine and Nova Scotia," raw materials such as "iron ore, soda ash, lime, sulphuric acid and coal," fertilizers, and general merchandise, all of which amounted to 2.35 million tons in 1903. Freight transportation by boat was cheaper than by rail and could reduce the cost of production.[17] In the

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15 Department of Commerce and Labor, 1910 pp. 96 - 102

16 Marshall, 2004

17 House of Representatives, 1910 pp 2-15

1880s and 90s, E. G. Brown built small river and harbor boats, tugs, barges and yachts in his Newark shipyard.[18]

The Passaic River begins in the Highlands of Northern New Jersey and empties into the Newark Bay. In its natural state its navigable depth was between 3 and 7 feet for a 16 mile distance to Passaic but had a shallow shoal near the bay. The Hackensack River begins in Rockland County, New York. In its natural state it was navigable to Hackensack but "was obstructed by bars extending from the junction with the Passaic River to the Newark and New York railroad bridge, a distance of about a mile, which limited practical navigation to a depth of about 8 feet at mean low water." An appeal letter from 1910, described ships "waiting for high tide" to get over a bar. The Newark Bay extends 6 miles from the confluence of the Passaic and Hackensack Rivers to Staten Island where it connects to the Kill van Kull and the New York Bays that connect with the Atlantic Ocean permitting transatlantic shipping.[19]

Improvements in navigation through dredging was the task of the United States Army Corps of Engineers. Their intent was "to make natural channels available wherever water-borne commerce" existed or was reasonably prospective throughout the US.[20] Increasing the depth of the Passaic River to 7½ feet was first proposed in 1872. Additional dredging projects were proposed in 1880 and 1902 and included a 12-foot deep channel though the Newark Bay from Staten Island up the Passaic River to the Montclair & Greenwood Lake Railroad bridge and 10 feet deep beyond, for a distance of 10.8 miles. In a fourth project from 1907, the channel depth was increased to a 16 foot depth and in 1912 it was increased to a depth of 20 feet.[21] Later projects increased its depth to 30 feet for the first 2½ miles and 20 feet for the next 4½ miles.[22]

The Hackensack River was not improved until the 20th century. A project for "the improvement of the Hackensack River" approved by the "River and Harbor Act" dated July 25, 1912, provides for "dredging a channel 12 feet deep at the mean low water; the width to be 200 feet from Newark Bay to Little Ferry, thence 150 feet to the New York Susquehanna & Western Railroad bridge, at an estimated cost of $171,000.00 and $6,000 per annum for maintenance."[23] Later 20th century projects increased its depth to 32 feet for the first 3 miles, 25 feet for the next ¼ mile, and 15 feet an additional ½ mile.[24]

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18 "Jersey Shipbuilders" NJ shipbuilding clipping file, Newark Public Library, January 23, 1954

19 House of Representatives, 1910 pp 2-15; Senate 1911 pp. 3-5, 76-78

20 Senate 1911 p 4.

21 War Department 1914 pp. 269-271; Senate 1911 pp. 3-5, 76-78

22 Marshall, 2004

23 War Department, 1914 pp. 274-275; House of Representatives, 1910 pp 2-15

24 Marshall, 2004

Private land companies filled portions of Kearny marsh with dredged material. According to a 1904 report discussing the dredging of the Passaic River, "all the dredged material was deposited on the east side of the river between the Newark Plank Road bridge and the Pennsylvania Rail Road freight bridge, and it was pumped ashore on the marsh between the Passaic and Hackensack rivers."[25] Likewise, the letter to the Secretary of War from 1910 concerning dredging the Hackensack River describes "conditions in land reclamation in that vicinity indicate that most of the dredged material would be used for filling by one of several land companies or contractors engaged in that line of work." This was described as being cheaper than pumping out to sea.[26]

Land Companies

The 1909 map of Kearny indicates the "Newark Meadows Improvement Company" as owner of the majority of Kearny meadows and Kearny point; nearly 3400 acres of meadows that included a portion of the site of the Federal Shipyard.[27] The Newark Meadows Improvement Company incorporated in 1908 under a plan to reorganize and consolidate the Hackensack Meadows Company which purchased the acreage in 1901 from the "late firm of S. N. Pike and others" and the New Jersey Terminal Dock and Improvement Company was incorporated in 1905 and acquired control through ownership of the majority of stock.[28] These land companies used landfill to "improve" the meadows, subdivide smaller plots and resell for development. Stockholders J. P. Morgan and W. K. Vanderbilt intended to transform the meadowlands into a center of transportation where "transatlantic steam lines connect with railroads controlled by Vanderbilt and Morgan." The NJ Terminal Dock and Improvement Company also acquired control of the "Federal Contracting Company" which held dredging contracts. In 1914, the Newark Meadows Improvement Company foreclosed on its land holdings and the acreage was subsequently transferred to "Newark Factory Sites,

1909 G. M. Hopkins Vol. 2, *Atlas of Hudson County*, showing the site of the Federal Shipyard on Kearny Point and a hypothetical development plan that was apparently proposed by the Newark Meadows Improvement Company.

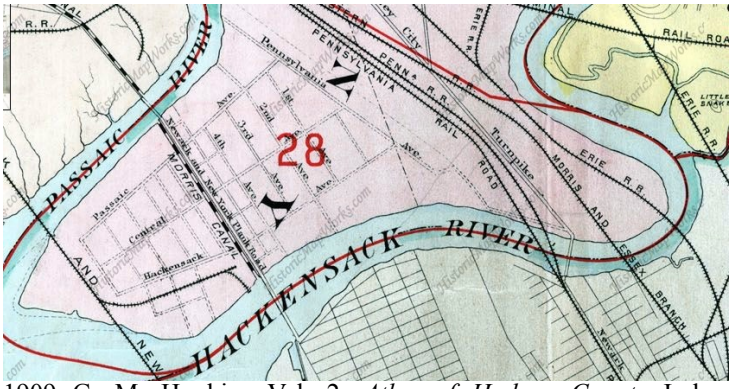
[25] Livermore 1904 p. 1133

[26] House of Representatives, 1910 p. 12

[27] Hopkins 1909

[28] Pike had conducted an earlier land reclamation project that failed.

Inc." which incorporated in February of 1915 and remained active through the 1930s.[29]



1909 G. M. Hopkins Vol. 2, *Atlas of Hudson County* Index, showing Kearny Point

Kearny Point

US Steel chose a 175 acre site within Kearny Point to build the Federal Shipyard and Drydock Company. Kearny Point is geographically distinct as a 2 square mile peninsula bordered by the Passaic and Hackensack rivers. It was sectioned off in the 19th century from the remainder of Kearny Meadows by the Pennsylvania Railroad which had an extensive railroad yard with multiple lines at the northern edge of the point. The Morris Canal and the "Newark and New York Plank Road" traversed the central part of the peninsula. The Central Railroad of New Jersey crossed the southern tip. The Federal Shipyard site is between the Morris Canal and the Central Railroad on the east side of the peninsula.

The 1909 Hopkins map shows a hypothetical development plan apparently proposed by the Newark Meadows Improvement Company. The notations for proposed urban style blocks are shown in the center of the peninsula with three streets running north/south (Hackensack, Central and Passaic) and thirteen cross streets. Some of the blocks show 25' x 100' residential style lots. Two proposed "ship slips" are shown on the Hackensack River and two are shown on the Passaic (one north and one south of the canal on each river front). The southeastern one became the site of the Federal Shipyard Company and the southwestern one the site of the Foundation Company Shipbuilding plant. "Bulkhead" and "pierhead" lines, which were established by the federal government in 1907, are shown extending the shoreline into both rivers.

The only actual development shown on the 1909 Hopkins map was adjacent to the canal and the plank road on both rivers. The New Jersey Zinc Company had 12.5 acres and several frame and brick buildings on the Hackensack River. It was served by a rail spur from the Central Railroad. Adjacent to it was a 7 acre lot owned by the New York and NJ Water Company which held a "right of way" through the meadows. No buildings are shown on that site. On the Passaic River side, the New Jersey Chemical Works and the Newark Plaster Company had small sites with frame buildings.

Kearny Point began to industrialize during World War I with the opening of the shipyards in 1917: The Foundation Company Shipbuilding Plant, which made wooden ships for the government during WWI, and the Federal Shipbuilding Company which built and repaired steel

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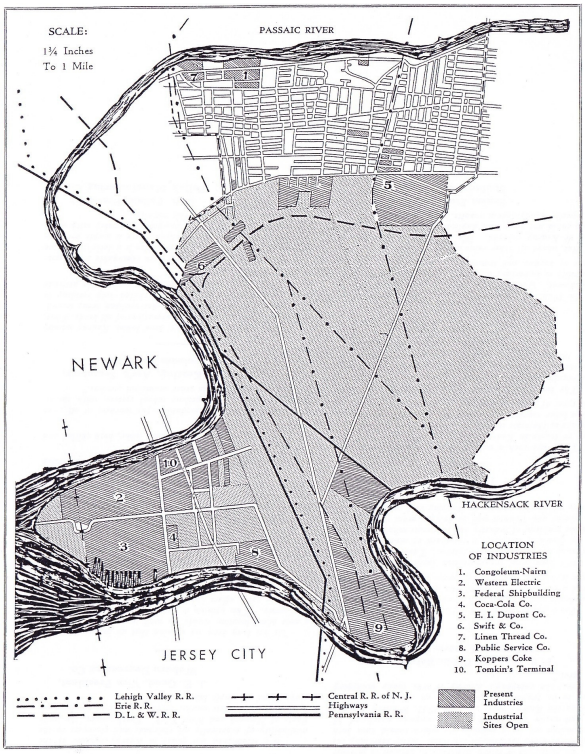
[29] Department of Commerce and Labor, 1910 p. 102; "Stokes v. Newark Meadows Improvement Co." The Atlantic Reporter St. Paul, West Publishing Co., Vol. 106 April 24-July 17, 1919 p. 132-137

ships through World War II. By that time the Newark Bay was a congested port, but aside from the shipyards, the Kearny Meadows remained virtually undeveloped. This quickly changed. The Egyptian Lacquer Manufacturing Company, the Riverside Steel Casing Company, and the Indian Refinery Company of NY are shown on the 1918 Sanborn map. Next to arrive on the Peninsula was Henry Ford's assembly and distribution plant which manufactured "500 cars a day" and was one of Ford's 17 assembly plants in the US, Canada and Europe. Ford proposed enlarging this plant in 1922 to make it his center for car exports due to the superior shipping facilities in the Newark Bay.[30] In 1923, Western Electric bought the 55 acre site of the former Foundation Company shipyard and built a plant to manufacture lead-covered telephone cable.[31] Storage and shipping warehouse facilities also found Kearny Point attractive.



1939 map of Kearny. Industrial sites are cross hatched, meadows are grey, Kearny uplands are white. Location No. 3 is the site of the Federal Shipyard.

Kearny Point was officially zoned for industrial use in 1922.[32] The 1934 map of Hudson County shows the point heavily developed with industrial activity including plants operated by the Public Service Gas and Electric Company, Newark Concrete Pipe Company, Koyptian Lacquers and the Lincoln Terminal Company.[33] Access to the industrialized Kearny Point from Kearny uplands was through the meadows on either the Newark or the Belleville Turnpike (Schulyer's log road). The Jersey City and the Ironbound section of Newark had direct access from Lincoln Highway. Completed in 1932, the "Newark-Jersey City High Level Viaduct" (known today as the Pulaski Skyway) was built to connect Newark and Jersey City as part of the Route 1 corridor which was laid out in the 1920s to cover the entire eastern seaboard between Maine and Florida. The skyway was built with an access ramp on Kearny Point to promote its industrial development.

The remainder of the Kearny meadows stayed marshland and sparsely developed; the 1930 aerial photograph shows little change from the 1909 map. The 1934 Hopkins map indicates that most

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30 "Jobs for 10,000 in Enlarged Ford Plant in Hudson" Jersey Journal (Jersey City, NJ) September 12, 1922 p.6

31 "Pays $500,000 for New Factory Site" The New York Times January 11, 1923; Krasner, 2007 p. 46

32 Personal Communications with Michael Martello, Kearny Administrator/Construction Official

33 Hopkins, 1934

of the undeveloped sections of the meadows remained in the ownership of "Newark Factory Sites Company, Inc." Use of the Kearny marshland beyond the point for large scale warehouses and distribution centers occurred after the opening of the New Jersey Turnpike in the second half of the 19th century.

C. WWI and the FEDERAL SHIPBUILDING PROGRAM

WWI began in 1914. The United States remained neutral for nearly 3 years, but Germany was seen as a dangerous threat to democracy and US power. The United States Congress ratified President Wilson's petition to enter the war on April 6, 1917, siding with Great Britain and its allies. Almost immediately after ratification, the United States shifted into mass production mode. Airplanes, ammunition, uniforms, barracks, military camps, etc. had to be manufactured or constructed at a rapid rate. The largest war effort was shipbuilding. A massive number of ships were needed to transport troops across the Atlantic and to combat German submarines which at that time "were threatening to deplete the world's shipping" (8 to 9 million deadweight tons were destroyed in 1917).[34] Cargo ships were needed to supply the American army in France. The US committed to "bridging the sea with a fleet of ships." All war efforts depended on ships.

On September 7, 1916 Congress passed an act which created the United States Shipping Board that consisted of five presidential appointed commissioners and was intended to solve problems related to commercial shipping that developed because of the war. The shipping act authorized the board to form a corporation "for the purpose of construction, equipment, lease, charter, maintenance and operation of merchant vessels..." Unable to depend on other nations for ships to carry troops and munitions, on April 16, 1917, just 10 days after entering the war, the Emergency Fleet Corporation (EFC) was formed with the capital stock of $50 million to create a new fleet of merchant ships. This feat was regarded as "the most gigantic undertaking ever attempted by man." Within the course of a year and a half, the Emergency Fleet Corporation was authorized to spend $3.671 billion for the construction of ships.[35]

The EFC controlled all of the shipbuilding in the US except for naval vessels which were built under a separate $1.15 billion naval shipbuilding program. New shipyards were needed for the EFC program because the navy department took over about 70% of the existing yards to build a large fleet of submarine destroyers. Equipment for the destroyer program took priority over the merchant ship program.[36]

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[34] Mattox 1920 p. 2 and 18

[35] Ibid pp. 3-7

[36] "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 15

General George W. Goethals and Other Managers

When the United States entered the war, building a fleet of steel ships seemed unattainable. The existing shipyards did not have the capability to expand nor the required workforce. Chairman of the United States Shipping Board, Mr. William Denman, proposed to quickly build a temporary fleet of standard wooden ships. Major General George W. Goethals, a recognized master engineer who was responsible for the Panama Canal and the chief consulting engineer for the NY- NJ Port and Harbor Development Commission, became the first general manager of the Emergency Fleet Corporation. Goethals saw beyond the emergency of war, and proposed building a permanent merchant marine fleet. He was not against the construction of wooden ships but emphasized the production of steel ships by doubling shifts, expanding existing plants and building new plants.[37]

The dual authority granted to both agencies resulted in Goethals' resignation on July 27, 1917; President Wilson subsequently requested Mr. Denman's resignation. The "failure to retain General Goethals" was later seen as a detriment to the program.[38] Goethals' successors also found the dual authority problematic and time consuming. The bi-laws were revised and full power was given to the EFC in December of 1917. Charles Piez, the fourth general manager of the EFC, took office December 18, 1917.[39] After further reorganization and on April 16, 1918, Charles M. Schwab of Bethlehem Steel and formerly of US Steel, was appointed Director General of the EFC to help get ships built faster.

Emergency Fleet Corporation

Before WWI, fewer than 50 seagoing merchant vessels were built in the United States each year. Ships were built in the US for domestic trade but few were built for foreign trade. Many of the merchant ships which served American industries "sailed under foreign flags - Britain, Germany, Norway, etc."[40] Production had increased by 1916, with new orders from foreign nations (largely Japan and Britain) and 417 steel merchant ships were contracted to be built in private American yards that year. In comparison, British shipyards built 439 steel vessels in 1916.[41] There were 61 shipyards (37 steel, 24 wood) with 235 shipways capable of building ocean going ships in the US at that time.[42]

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[37] Mattox 1920 pp. 20-21

[38] "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 15

[39] Mattox 1920 pp. 25-27

[40] "The Challenge to American Shipyards" The Federal Shipbuilder March 1920 vol. 2, no 8, p. 3

[41] "Big Boom in our Ship Yards" Commercial West November 18, 1916 p. 33

[42] Mattox, 1920 p. 43 and 139

General Goethals' July 1917 plan to federalize the shipbuilding industry began with contracts for 104 new ships (38 steel, 34 wood and 32 composite) with January 1918 delivery dates. Requisitioning all steel ships over 2,500 tons under construction or contract in American yards, however, would deliver ships faster. On August 3, 1917, Goethals' proposed requisition was authorized and the title for 431 merchant ships was transferred from the original purchaser to the US Shipping Board with just compensation. The yards were required to complete construction under the direction of the Emergency Fleet Corporation and could not enter into additional contracts without authority.[43] Captured German vessels were renamed and put to use. Requisitioning would nearly double America's fleet but would not bring enough ships. "German Submarines were sinking the allies' ships at an alarming rate in 1917."[44] New and expanded yards were needed.

The Emergency Fleet Corporation (EFC), with headquarters in Washington, DC, began with a personnel of 5, but grew steadily as the program developed. Within a year the EFC had 1000 employees, including technical experts who directed every detail of ship construction. Many were experienced former naval officers who in turn trained others. Private executives, such as Charles Schwab, were asked to leave their businesses to nobly serve this war effort. The EFC took over the shipbuilding industry and oversaw all aspects including the construction of new shipyards, enlargement of existing plants, filling swamps and dredging, accruing, training, transporting and housing workmen, vessel design, fabricating and transporting all materials and equipment needed to build and supply ships. Using a method to standardize ship construction called the "fabrication method," the speed and quantity of production was greatly increased. The US Shipping Board held the contracts for the construction of the merchant ships.

New yards were built along the Atlantic coast, the Great Lakes, the Gulf of Mexico and the Pacific Ocean. The EFC acted in partnership with private corporations. It promoted the industry by providing loans and advanced payments to finance the construction and expansion of shipbuilding yards. Loans were extended to 65 steel shipyards, 83 wood shipyards, 7 concrete shipyards, 18 manufacturing plants, 40 storage and warehouse projects, 25 transportation projects and 25 housing projects.[45] Within the 18 month period, 111 new yards with 558 shipways were built at an expenditure of approximately $210 million.[46] During the 18 month war period, the EFC oversaw 526 contracts for 2,572 vessels totaling 16,482,611 deadweight tons and included cargo carriers, tankers, troopships, "submarine chasers," coal and lumber barges, oil tank barges, seagoing harbor tugs, refrigerator and hospital ships, wooden cargo and

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[43] Ibid p. 33, 36 and 63; Business Digest 1917 p. 605 and 608

[44] Ibid p. 213

[45] Mattox, 1920 p. 227

[46] Ibid p. 206

sailing vessels, and concrete ships. The Federal Shipyard attained a contract to build 30, 11-knot, 9,700 deadweight ton cargo vessels.[47] The ships were of the highest quality.

The shipbuilding program created a new American industry practically overnight. New yards began to be constructed in the summer and fall of 1917 and most were nearing completion by the end of 1917. Construction on the Federal Shipbuilding and Drydock Company began in July of 1917. The keel of its first ship, "The Liberty," was laid out November 15, 1917 and it was launched June 19, 1918.[48] The name "Federal Shipbuilding" apparently indicates its intended purpose to acquire federal contracts, but it was a private yard backed by US Steel. Yards which were subsidized by the EFC include the American International Shipbuilding Corporation at Hog Island, Pennsylvania, the Submarine Boat Corporation yard at Newark, New Jersey, and the Merchant Shipbuilding Corporation at Bristol, Pennsylvania (which was affiliated with the American Bridge Company).[49] The government subsidized yards accounted for 25% of production during the war. By April of 1918 the total monthly output of American shipyards was 31 steel and 15 wooden ships. The total grew each month until armistice; 60 steel and 55 wooden ships were produced in November 1918.[50]

Directing the shipbuilding industry was a tremendous organizational feat. The corporation functioned under 11 geographical divisions. Various departments came into being as specific needs arose. Plant construction came under the direction of the shipyard plants division. Agents were sent to scout locations for new coastal yards. The supply division was the largest unit; it allocated materials monthly according to the needs of each yard and coordinated everything a ship needed from its engine to a frying pan, the iron ore mines, fabrication mills, manufacturing plants, delivery by rail or boat, and prevented delays due to a lack of materials or equipment. Private companies like Westinghouse built necessary items such as turbines and reduction gears for the corporation.[51] The federal board had jurisdiction over wages, hours and working conditions. The performance branch inspected operating efficiency of completed ships by attending trial trips.[52] Steel ships were required to attain A-1 classification. The engineering section was kept informed of the successes and failures.

Shipbuilding depended on a steady supply of fabricated steel components, but steel was in a limited supply due to the needs of the other war industries. The amount of steel handled by the supply division between August 1917 and January 1, 1919 would build 31,600 miles of railroad

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[47] Ibid p. 232

[48] "Twenty-Seven Ships Delivered by Federal Yard in 1919" The Federal Shipbuilder January 1920 vol. 2, no 6 p.15

[49] Mattox 1920 pp. 40, 46, and 206; "A Retrospect" The Federal Shipbuilder January 1920 vol. 2, no 6 p. 4

[50] "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 p. 266

[51] Mattox, 1920 p. 144

[52] Ibid p. 67

and was valued at $2.45 million.[53] At the height of production 400,000 tons were utilized a month. The need for steel was so great that the government was forced to take charge of its distribution to the various war industries; in fact all industrial resources were placed at government command. Shipyards were required to send estimates of their requirements each month.[54]

The increased production required an increase in the workforce from approximately 50,000 to 400,000 men. A national appeal for men included high wages for skilled workers, trades training for non-skilled workers, military exemption ("work or fight" rule) and transportation and was marketed as a patriotic duty second in importance to the front line. Shipbuilding recruiting centers were established throughout the country. Posters with headings like "On The Job For Victory" showed shipyard workers with a rivet gun and conveyed the war time importance of shipbuilding. The patriotic appeal proved to be valuable for attracting workers at a time of wartime shortage. Men of all nationalities, skills and geographic locations responded. When armistice came, about 300,000 people were directly engaged in the production of EFC ships and an additional 375,000 men worked in industrial plants which manufactured ship parts and equipment: Nearly 675,000 men were directly or indirectly engaged in the merchant marine program.[55]

The "Emergency Fleet News" published the progress of each yard to foster the spirit of rivalry competition. The statistical department kept records of construction at each yard. A riveting contest was initiated between American and British shipyards. A 7,500 ton fabricated ship had about 650,000 rivets.[56] A good riveter could drive 4 to 500 rivets a day.[57] Teams of three to five riveters worked together. The American record was set by Edward Gibson and his "gang" that drove 2919 three quarter inch rivets in eight hours at the Federal Shipbuilding Company. Before the war it took 9 months to a year to build a 3500 ton ship; a year and a half to build a 5500 ton steel ship; and from a year and a half to two years to build 8000+ ton vessels.[58] Using the standardized fabrication method of shipbuilding, the New York Shipbuilding Corporation in Camden, New Jersey launched and delivered "Tuckahoe" - a 5,500 ton steel ship - in 37 days. This initiated competition in shipbuilding performances. The "Craw Keys" a 3,350 dead weight

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53 Ibid p. 119

54 Ibid pp. 123-24

55 Mattox, 1920 pp. 70-72

56 "The War's Effect on Merchant Shipbuilding" Journal of the AmericanSociety of Naval Engineers vol. XXX Washington DC 1918 p. 190

57 Mattox, 1920 p. 57

58 Ibid pp. 82-83

ONE OF MANY POSTERS USED BY FLEET CORPORATION TO ENCOURAGE PRODUCTION

ton steel cargo ship built by the Great Lakes Engineering works in Ecorse, Michigan, which was completed in 29 work days from start to delivery, held the record for the fastest construction.[59]

Between April 1917 and November 1918, America grew from being one of the lowest producers of the industrialized shipbuilding countries to one of the highest producers. The "US launched a greater tonnage of merchant ships [in 1918] than all nations in the world turned out in any year prior to the war." This was 25% more than the rest of the world combined. The number of ships produced in 1918 exceeded the production of the 10 years prior and was more than double the 1918 output of Great Britain.[60] America's shipbuilding program helped to win the war. "As fast as the merchant ships of the allies were sunk by the German submarines, the new cargo carriers turned out in many of the yards of this country were ready to take their place and by the end of the war, ships were launched faster than they were sunk."[61]

The first armistice was signed November 11, 1918. The war ended before the shipbuilding program could achieve its highest potential. The Federal Shipyard completed its first 9,600 ton ship only about 5 months before armistice. Goethals' federal takeover of private shipyards was intended to end within 6 weeks after armistice. The EFC began to reduce its program and canceled some of the contracts that were in process at the time.[62] After a survey of the fleet that was under construction in February 1919, the EFC recommended selling the small vessels (under 5000 tons) for private commerce. Some of the wooden ships were dismantled and materials salvaged. The uncompleted wooden ships at the Foundation Company on Kearny Point were scrapped in the 1920s.[63] Larger cargo steamers and combined cargo/passenger vessels were

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[59] Ibid p. 108

[60] Ibid p. 205

[61] "Schwab Resigns as Director-General of Fleet Corporation" *The Rudder* vol. XXXV No. 1 January 1919 p. 6

[62] Mattox, 1920 p. 234

[63] "Foundation Company" http://shipbuildinghistory.com/history/shipyards/4emergencylarge/wwone/foundation.htm

completed and kept in service. The Federal Shipyard Company completed the remaining 27 ships of its 30 ship contract after the war ended.[64]

The Jones Act of 1920 states that it is "necessary for the national defense and for the proper growth of our foreign commerce, that the US shall have an American merchant marine of the best equipped and most suitable type of ships to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by American citizens."[65] WWI "gave back to the United States its shipbuilding industry which it had lost years ago."[66] Ships were seen as a "necessary part" of the world's "transportation system" and continued to be built in peacetime. In 1927 the Emergency Fleet Corporation was renamed the Shipping Board Merchant Fleet Corporation. It was terminated in 1936 when the functions were transferred to the US Maritime Commission.

Shipyards of the WWI Era

In the early 20th century, most shipyards were small and the demand for ships was limited. Gone were the days when American ships were a national pride. In 1900, ships built in the US cost 25% more than those built in the UK because most of the steel had to be imported.[67] Shipbuilding was not seen as an attractive new business. Many of the established shops grew from family owned businesses. John Roach was one of the leading US shipbuilders in the mid 19th century. His son John operated the Delaware River Iron Shipbuilding and Engine Works in Chester, Pennsylvania, which at times employed over 2000 and was once the largest shipbuilding concern in the nation.[68] Others competed for military contracts. In 1902, the Newport News Shipbuilding & Drydock Company, which was founded in 1886, won the 3 million dollar contract to build the 16,000 ton Battleship Louisiana.[69] Bath Ironworks on the Kennebec River in Bath, Maine, which was founded in 1885, built battleships and destroyers for the US Navy.

Nineteenth century yards, like the one operated by John Roach, were fully equipped shops capable of fabricating all of the required components on site. The shipyards built for the US Shipping Board during WWI were assembly yards with 80% or more of the materials used in the construction of ships pre-fabricated elsewhere. The outbreak of WWI created a shipbuilding boom with foreign contracts. But the construction of new shipyards only became economically attractive by the program of the Emergency Fleet Corporation: its contracts, its financial

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64 Smith, 1920 p. 275

65 Mattox, 1920 p. 276

66 "The Federal Shipbuilder" The Federal Shipbuilder January 1920 vol. 2, no. 6 p.4

67 "Building Mighty Warships in American Shipyards" The New York Times October 19, 1902

68 Derby, 1916 p. 285

69 "Building Mighty Warships in American Shipyards" The New York Times October 19, 1902

Advertisement from the Rudder Magazine.

assistance, and its reliance on the fabrication method. The tonnage called for by the EFC in 1918 was eight times that of the production in 1916.[70] Forty five shipyards were built under EFC management.[71]

Within 6 weeks of the formation of the EFC, the American Bridge Company purchased land for the construction of the Federal Shipyard and Drydock Company in Kearny, New Jersey. It was one of three WWI era shipyards built in the Newark Bay. Other companies, some with little or no background in the shipping industry, worked with the EFC to build new yards. This was the case with the Foundation Company Shipbuilding Plant, also on Kearny Point, which was built on land leased from auto manufacturer Henry Ford shortly after the war began. The rent was nominal; Ford considered the lease a contribution to the war effort and had no further involvement. Twelve shipways were built for the construction of wooden ships to carry food and munitions to the allies in France. The 1918 Sanborn map describes it as a "wooden ship" builder "under control of the Emergency Fleet Corporation." The Foundation Company was a general contracting firm specializing in substructure work including foundations for skyscrapers and was headed by Franklin Remington, who also made firearms and typewriters.[72] The yard closed shortly after the war.

New yards were also built by established boat building concerns that moved quickly to expand after the US entered the war. The Submarine Boat Corporation (a predecessor of the Electric Launch Company) in Bayonne, New Jersey, was founded in 1899 by John Holland. This successful company made submarines for the US Navy and other countries and wooden "submarines chasers" for Britain, France and Italy during WWI. On September 14, 1917, it contracted with the EFC to build a new agency yard for a 150 ship contract. The swampy site which faced the Newark Bay was obtained from the City of Newark and the plant cost $16 million to build. It had 28 shipways but could only fabricate 6% of the required steel on site. It was the largest shipbuilding plant in the New York metropolitan area, and the second largest in the nation. Men were trained on site. The ships built for the US Shipping Board were 5,500 dead weight ton steel cargo vessels. The first keel was laid on December 3, 1917; the first ship, "Agawam," was launched May 30, 1918 but it experienced repeated mechanical problems. The last ship was delivered in 1920. Although all 150 ships were built, the Shipping Board only

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70 "America's Great Shipbuilding Development" The Iron Age January 3 1918 p. 14

71 Mattox, 1920 p. 223

72 "Ship Plant Site is Leased from Ford" The New York Times April 30, 1917

purchased 118 and the remaining 32 required private sale. The company nearly went bankrupt after the war ended.[73]

In November 1917, a union strike was called to protest the 1200 non-union men hired to build the Submarine Boat Company. This involved a walkout of union workmen who were building the Federal Shipbuilding Company, the Foundation Company and several other war-related work sites. Unions basically "ran" Newark and would not permit disruption of union parameters even during the war.[74] Other strikes over hiring non-union contractors occurred.

The plant for the American International Shipbuilding Corporation at Hog Island was also financed by the EFC and became the largest in the nation during WWI. It was sited on a private 900 acre tract of semi-accessible marshland, south of Philadelphia, in September 1917 near the League Island Navy Yard. A fully equipped plant was built with shipways, storage yard, administration building, shops, rail and highway facilities and workers housing at a cost of 70 million dollars. It was designed to assemble ships using the fabrication method and to employ 30,000 workers. The yard design included 50 shipways, fitting out basins for 28 vessels, 75 miles of rail, and 30 locomotive cranes.[75]

The Merchant Shipbuilding Corporation in Bristol, Pennsylvania was the third great EFC shipyard that was built during WWI. A subsidiary of the American Bridge Corporation, it contracted with EFC on September 7, 1917 to build a plant for a 60 ship contract. William Averell Harriman (1891-1986) was the principal stockholder and Mr. R. H. M. Robinson (whose brother was on the shipping board) the president. Harriman was the son of a railroad baron, Edward Henry Harriman, and later became the 48th governor of New York. This $12 million plant was built with government aid, had 12 ways with fitting out piers for 9000 tons ships, and shops that could fabricate up to 15% of the required steel. A small "model town" was built to house employees. The first keel was laid out February 16, 1918. The yard closed in 1921.[76]

Other yards conceptualized too late in the game. In March of 1918, Henry Ford announced plans to build a third shipyard on Kearny Point to fabricate small patrol boats and submarine chasers. Land was purchased and the plans were approved by the EFC, but evidently the war was over before the plans materialized.[77] There is no evidence to show it was ever built.

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73 "Port Newark's Immense Shipyard" The Port of New York Harbor and Marine Review February 1922 p. 10; "Newark Bay Shipyard" http://www.globalsecurity.org/military/facility/newark-bay.htm

74 "War Workers' Strike is on" NJ shipbuilding clipping file, Newark Public Library, November 12, 1917

75 "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 17

76 "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 16; Hurley 1927 p. 70

77 "$2,000,000 Plant to Build U-Boat Chaser Here" Jersey Journal (Jersey City, NJ) July 2, 1918 p.1

At armistice signing, 216 shipyards (77 steel, 117 wood, two composite and 7 concrete) with 970 shipways were being used for the construction of ships for the Fleet corporation.[78] Standardization made the war effort possible. But many of the yards built specifically for the fabrication method found it difficult to transition in peacetime and closed by the early 1920s.

The Fabrication Method of Ship Building

General Goethals proposed a rapidly built fleet of "fabricated steel ships" using standard parts and standard designs. Prior to the war, ships were built for individual owners. But with the US Shipping Board as the single owner of a large fleet, contracts were written for a set quantity of identical ships. The WWI era contract with the Federal Shipbuilding Company was for 30 cargo vessels of about 9,600 tons deadweight capacity.[79]

The fabrication method began as an experiment. The American Bridge Company (AB) was instrumental in the development of bridge construction using standardized parts and adopted the concept to shipbuilding. In 1903, it built the largest steel fabricating facility in the world. Its principal products were: barges, boats, bridges, industrial, mill and office buildings, tanks and turntables.[80] In 1915, AB purchased the Delaware River shipbuilding plant in Chester, Pennsylvania, which was previously operated by John Roach, and converted it into a fabrication yard. Their success led to its widespread use during WWI. Ships built with this method proved to be equal or better to the older method.

The January 3, 1918 issue of *Iron Age* magazine lists the top 6 large fabrication yards of WWI:

- The Hog Island plant of the American International Shipbuilding Corporation near Philadelphia, Pennsylvania.
- The Port Newark plant of the Submarine Boat Corporation in Port Newark, New Jersey.
- The Merchant Shipbuilding Corporation in Bristol, Pennsylvania (subsidiary of AB, which was owned by US Steel).
- The Chester Shipbuilding Company, Chester, Pennsylvania (subsidiary of AB).
- The Federal Shipbuilding Company, Kearny, New Jersey (Subsidiary of US Steel).
- Chickasaw Shipbuilding Company, Chickasaw, Alabama (Subsidiary of US Steel).

Four of the 6 large fabrication yards were owned by US Steel or its subsidiary American Bridge. *Iron Age* states that the Chester yard was the only one turning out completed ships at that time, but that keels had been laid at most of the others and expected a rapid turnout from then on.

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78 Mattox, 1920 p. 69 and 206

79 "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 P. 266; "The War's Effect on Merchant Shipbuilding" Journal of the AmericanSociety of Naval Engineers Vol. XXX Washington DC 1918

80 "Timeline" http://manufacturing.americanbridge.net/AboutUs/timeline.php

R. H. M. Robinson, President of the Merchant Shipbuilding Corporation and the Chester Shipbuilding Company, describes a fabricated ship as follows:

> "a ship on which the work of punching and shaping the plates and, to some extent, assembling and riveting is done in a fabricating shop, ordinarily employed for bridge or tank work, as distinguished from the usual practice of doing it in a shipyard punch shop."
>
> "the steel work [is] done by those who are specialists in the line of fabricating steel with all of the special tools and labor-saving devices at their disposal. It relieves the mind of the shipyard operator from the multitude of details that goes with such work, reducing his problems to those of engineering, erecting, riveting and assembling …"[81]

With a fabricated ship, up to 95% of the work could be done at a fabrication mill including punching the rivet holes and cutting the shapes. The parts were brought to the yard in sections that could be transported by rail. Each part was numbered and labeled and required a crane to move throughout the yard. With accurate drawings, ships could be assembled with parts coming from different fabrication shops. Only the bow and stern, which required careful bending, was made in the yard; this accounted for about 5% of the total fabrication. The yard work (riveting, equipment installation, etc.) was run on assembly. Even the engine came in parts, ready for on-site assembly.

The EFC had a technical branch which issued bulletins illustrating standard practice designs. Speed of completion was the primary goal but the fabrication method also reduced the price of the end product. Nonessential refinements of construction were eliminated. Before the war, ship anchors came in 50 different sizes and weights; the EFC reduced this number to reduce production costs. Likewise, lifeboats came in all sizes, shapes, and quality. Manufacturers were furnished with specific requirements, thus limiting the need to expend efforts on design and enabling a concentration on production.[82]

The fabrication method was a successful war time experiment that allowed for an increase in production. The concept was also adopted in England. The program was inhibited by labor and managerial shortages, difficulties in receiving shipments due to congested transportation lines, bad winter weather, and a host of other problems.

Labor Conditions

In England, a WWI law required workmen who were "essential in any war industry" to remain in his job until the war is over. Without this law in America, hiring labor was not so much the problem as keeping the labor. The yards experienced high turnover and frequent unionized

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81 "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 13

82 Mattox, 1920 p. 66 and 136

strikes. At some American yards an experienced shipwright could make as much as $175 a week. High wages, however, did not ensure productivity. Improvements in housing conditions around the plants were seen as the best way to retain workmen.

This changed in June of 1918 when the War Department announced that men of service age "must find employment in essential industries contributory to the Nation's military efficiency or else surrender their claims to exemption and go into the army." New Jersey also had a compulsory work law. In June of 1918, 3,000 men sought employment at the Federal Shipyard, but few were found suitable.[83]

The fabrication method allowed the use of semi-skilled labor. The EFC established a training school at Newport News Shipbuilding in Virginia, where mechanics from each yard were trained in how to train new recruits at their own yard. New employees could be trained in the fabrication process in a few weeks if they had previous mechanical training. The training school that was set up at Hog Island advertised "unskilled men, while being trained as riveters, reamers, chippers, caulkers, erectors, riggers, ship-fitters etc., are paid 30 cents per hour while learning." The Hog Island training program "covered practically all of the trades necessary in the building of fabricated steel ships."[84]

D. FEDERAL SHIPBUILDING and DRYDOCK COMPANY

The Federal Shipbuilding Company incorporated as a subsidiary of the United States Steel Corporation at the request of the United States government during WWI and in cooperation with the American Bridge Company, another subsidiary of the parent organization. The plant was designed for a dual purpose. It was a fabrication yard capable of turning out standard ships in the shortest possible time for war emergencies. It was also a permanent design/built shipyard for the construction and repair of all types of merchant ships. As discussed, many of the fabrication yards closed shortly after WWI. Its dual ability, along with its ability to construct large ships, and its competitive price goal on a world market, contributed to its longevity through WWII. Federal quickly established itself among the "old line of American shipyards" and among the "world's greatest builders of steel merchant ships."

US Steel and American Bridge Company

The United States Steel Corporation was founded in 1901 by banker J. P. Morgan, attorney Elbert H. Gary, and Charles Schwab by merging several steel companies including Carnegie Steel (founded by Andrew Carnegie in 1873), Federal Steel (financed by J. P. Morgan in 1898), the National Steel Company, and Illinois Steel (managed by Elbert Gray). By doing so, US Steel

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83 "Ship Yards Attract Men from other Industries" NJ shipbuilding clipping file, Newark Public Library, June 3, 1918

84 "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 17

became the world's largest business enterprise and controlled about two-thirds of the steel-making capacity in the United States. Carnegie Steel was purchased for $480 million, after which Andrew Carnegie turned toward philanthropic endeavors. Charles Schwab, who had been president of the Carnegie Steel and General Manager of the Emergency Fleet Corporation, became the first president of U. S. Steel. Schwab left US Steel in 1903 to build up its competitor, the Bethlehem Shipbuilding and Steel Company. James A. Farrell was president of US Steel between 1911 and 1932 and turned it into America's first billion dollar industry.[85]

US Steel also purchased companies that made use of steel and financed the formation of new subsidiaries that would do the same. US Steel purchased the American Bridge Company (AB) in 1901. AB was founded in 1900 through a JP Morgan-led consolidation of 27 bridge and structural companies, including the Keystone Bridge Company and its predecessor, the American Bridge Company, which was founded in Chicago in 1870. The consolidation acquired 90% of the bridge building market in the US at that time.[86]

The American Bridge Company is a design/build, civil engineering and fabrication firm specializing in the construction of bridges and large engineering projects. The firm remains in business today with headquarters in a suburb of Pittsburg, Pennsylvania. According to Wikipedia, "the company pioneered the use of steel as a construction material and developed the means and methods for fabrication and construction that allowed it to be widely used in buildings, bridges, vessels, and other plate applications." In addition to its steel fabrication plant, AB also owned 12 open hearth furnaces, four rolling mills, and 16 bridge and structural steel plants. AB contributed to the construction of bridges throughout the United States, Europe, Kenya, Mexico, Japan, the Philippines and South America. The firm fabricated material for the Bayonne Bridge (1932), the Verrazano-Narrows Bridge (1964), and the Pulaski Skyway (1930), and was also involved with the construction of the Empire State, Woolworth, Flatiron and the Chrysler buildings in New York City.[87]

American Bridge was involved with the construction of steel inland barges. In 1916, AB built 102 two small vessels (total of 52,100 dead weight tons) at their facilities in Ambridge, Pennsylvania and Trenton, New Jersey.[88] In 1915, AB purchased the Roach shipyard in Chester, Pennsylvania, which, as discussed, was the oldest shipyard in the US at that time and was operated by John B. Roach until his death in 1908. The yard had been idle since 1907. AB built 14 merchant ships (67,700 dead weight ton) there in 1916 with the "plates, beams and structural forms" rolled and fabricated off site so that the men at the shipyard would have "little to do

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85 "James A. Ferrell" http://en.wikipedia.org/wiki/James_A._Farrell

86 "Timeline" http://manufacturing.americanbridge.net/AboutUs/timeline.php; "U. S. Steel Enters Shipbuilding Field The New York Times May 24, 1917.

87 "Timeline" http://manufacturing.americanbridge.net/AboutUs/timeline.php

88 "Big Boom in our Ship Yards" Commercial West November 18, 1916 p. 33

except bolt the parts together."[89] This yard was sold to a British company at a 200% profit and stock was merged with the Merchants Shipbuilding Corporation in Bristol, Pennsylvania, which was built under the auspices of the Emergency Fleet Corporation.[90] During World War II "100% of AB's capacity was committed to war efforts." AB built 199 landing ship tanks, 4 aviation repair vessels and built the major components for 11 Essex class aircraft carriers, one super-aircraft carrier, 31 auxiliary converted aircraft carriers, 77 C type cargo ships, 4 tankers, 20 cargo lighters, and 348 knock-down barges.[91]

During WWI, US Steel built a ship-plate mill in Homestead, Pennsylvania, which was designed to turn out 110-inch plates for ship construction. Other WWI efforts included an order of 15,000 tons of steel rails, which were shipped to France for their transportation system.[92] In addition to Federal, the US Steel built a sister yard in Chickasaw, which is near Mobile, Alabama. The Chickasaw Shipbuilding Company was built during the war but delivered its first ship in May of 1920 and closed a year later. The Tennessee Coal, Iron and Railroad Company (also a US Steel subsidiary) was affiliated with the shipyard and both played an important part in the industrial development of the south.[93]

Federal Shipbuilding Plant

Site A 240 acre site on the Kearny point was purchased in 1917 and 1918 by combining several tracts. The first purchase of 62.7 acres was on May 19, 1917. This transaction was between the American Bridge Company and Newark Factory Sites Incorporated and was subsequently transferred to Federal Shipbuilding and Drydock Company. The deed records a $10 purchase price but other references indicate its price of $330,000. Part of this land had been improved by filling with dredged material in the fall of 1913 by a contractor hired by the Newark Meadows Improvement Company.[94] A second tract of 86 acres was purchased in July 1917 also from Newark Factory Sites.[95] In February of 1918, Federal Shipbuilding and Drydock Company purchased two additional tracts; one of 93.67 acres from Newark Factory Sites and another that consisted of "lands underwater" from the State of N. J. by Board of Commerce and Navigation.

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89 "U. S. Steel Enters Shipbuilding Field The New York Times May 24, 1917

90 "Chester Shipbuilding Company" United States Naval Institute Proceedings vol. 43, no. 5 May 1917 p. 1063

91 "Timeline" http://manufacturing.americanbridge.net/AboutUs/timeline.php

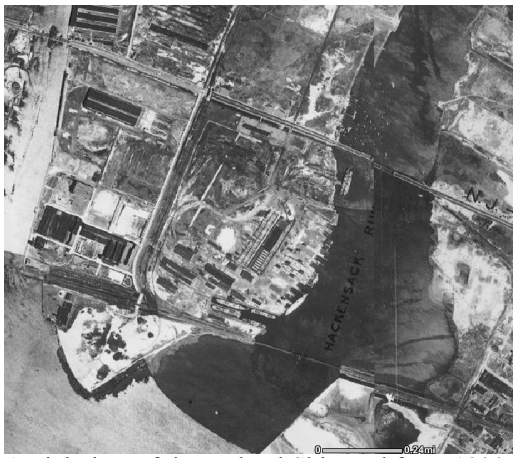
92 "To Build 10 Ships at Big Plant Here" The New York Times November 15, 1917

93 "Federal's Sister Yard Described" The Federal Shipbuilder February 1920 vol. 2, no. 7 p. 6

94 "Stokes v. Newark Meadows Improvement Co." The Atlantic Reporter St. Paul, West Publishing Co., vol.106 April 24-July 17, 1919 p. 135; Hudson County deed book 1252 p. 618 May 24,1917; and book1268 p. 52 dated August 17, 1917

95 "U. S. Steel Backs New Shipyard Co." *The New York Times* July 24, 1917

Federal Shipyard site under construction August 1917 from *The Federal Shipbuilde*r, February 1920



Aerial view of the Federal Shipyard from 1930

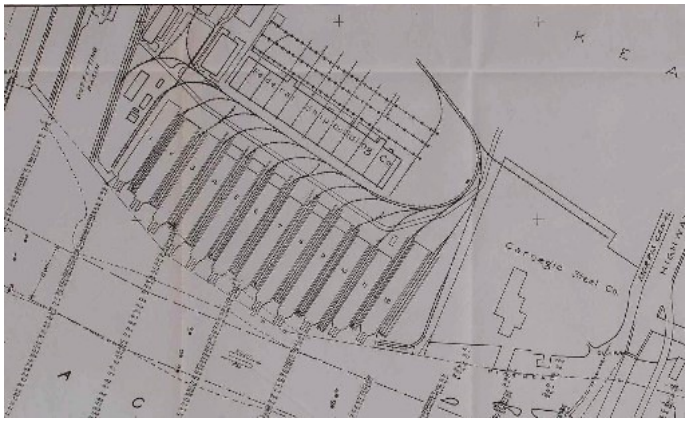
The latter was described as being in front of their existing property on the northwesterly shore of the Hackensack River and cost $4,380.[96]

The shipyard site is on the western shore of the Hackensack River on Kearny point south of Lincoln Highway and had a 2400 foot river frontage. The Newark branch of the Central Railroad of NY (freight) borders the southern and western boundaries of the site. The Pennsylvania railroad entered the yard from the north by crossing Lincoln Highway and the Morris Canal with a temporary railroad bridge. This railroad also served the Foundation Company Shipyard which bordered Federal to the west. The site extends northward to Lincoln Highway and the Morris Canal. About 20 acres in the northwest corner were not part of the original purchase, but were acquired for expansion during WWII. It was owned by the Carnegie Steel Co in the 1920s/30s, the Eastern Nodulizing Works in 1918, and the New Jersey Zinc Company in 1909.

Yard construction began in August 1917. The $6 million projected construction cost was doubled before the yard was completed. It was financed by US Steel apparently with some aid from the EFC. Robert McDonald, a marine engineer who worked for US Steel in an advisory capacity on

96 Hudson county deed book 1273 page 342; book1275 p. 293 February 19, 1918; and "U. S. Steel Backs New Shipyard Co.," The New York Times July 24, 1917.

shipbuilding, was in charge of yard construction and operations.[97] Elbert H. Gary (US Steel co-founder) was president; Robert McGregor was the vice president and general manager. Foremen and superintendents were brought from the Homestead Mill.[98]


Map of the Hackensack River, 1926 showing the 12 completed shipways

Parts of the site were underwater or marshland and required 220,000 cubic yards of fill. In August 1917, the Atlantic, Gulf and Pacific Dredging Company dredged in front of the shipways and created the wet basin. With the river improvements that were conducted by the United States Army Corps of Engineers a few years prior, "comparatively little dredging" was required "to get sufficient depth of water for large freight ships to make their way out through Newark Bay to sea."[99] The dredged material, ashes and sand pumped from the river were used for fill.[100] However, this did not prevent the site from flooding while under construction in a November storm.[101]

Shipways The plant was designed with 10 timber shipways that extended "beyond tide water." Two additional ways were added before the war ended. The size of the ways (400 feet long, 55 feet wide, and 38 feet deep) were based on the probable size of the ships to be built - 9600 ton cargo ships. Fraser, Grace and Company, professional dock builders from New York, constructed the shipways and built temporary railroad tracks.

The first five shipways were completed by the end of 1917 allowing the keels of the first ships to be laid out before the plant was completed and within four months of purchase. The second set of five ways were completed by June of 1918. The final 2 were built between June and September 1918. The shipways were carried on wooden piles with the tops sawn to make an incline for the ships to slide down and into the Hackensack River at launching. Heavy concrete abutments were built at the sides to support towers of timber scaffolding built with an open framework that reached the top of a ship. Portable electric tower cranes (one per pair of ways)

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97 "U. S. Steel Backs New Shipyard Co.," The New York Times July 24, 1917

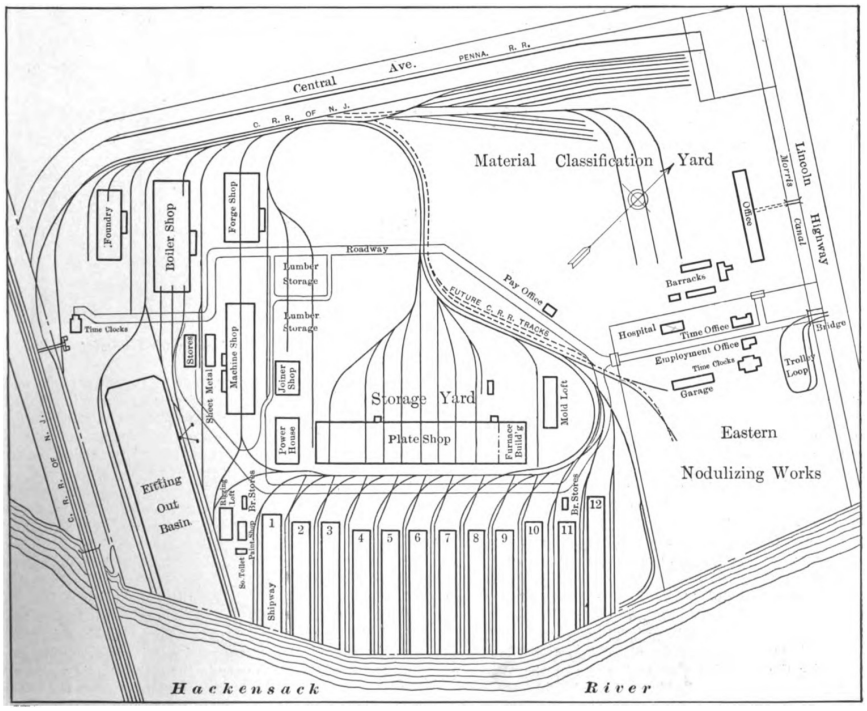
98 "Big Dry Docks Planned for Jersey City" Jersey Journal (Jersey City, NJ) June 20, 1918 p. 1

99 "Big Shipyard to be Located on Meadows" Jersey Journal (Jersey City, NJ) May 24, 1917

100 "History of the Federal Shipbuilding Plant" The Federal Shipbuilder February 1920 vol. 2, no. 7 p. 19

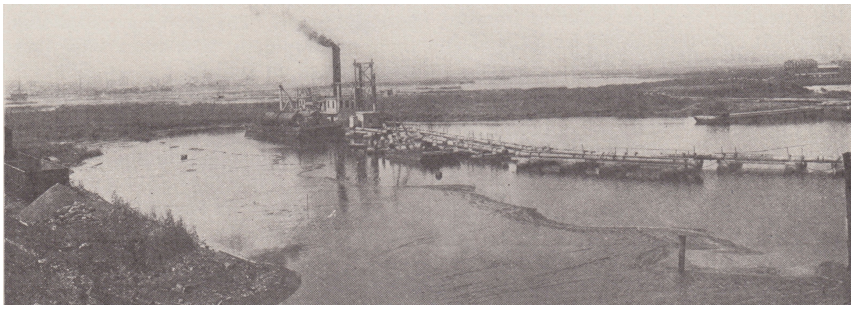
101 "Men Work Rapidly on Big Ship Plant" NJ shipbuilding clipping file, Newark Public Library, November 2, 1917

carrying two or four 15 ton derrick booms with a 65 foot reach, handled materials at the shipways.[102]



General site plan from 1919

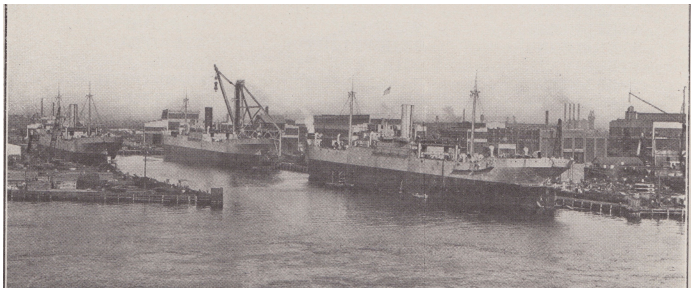
Wet Basin After a ship was launched into the river from its way, it was pulled by tug boats to the wet basin which was located south of the shipways at the southern end of the yard. The wet basin was used as a "fitting-out" birth for up to 8 ships and was served by locomotive cranes. Boilers and engines were handled by a stationary, three-leg jib crane with 100 ton capacity.[103]


Site of wet basin and shipways, August 1918 *The Federal Shipbuilder*, January 1920

[102] "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270; "Men Work Rapidly on Big Ship Plant" NJ shipbuilding clipping file, Newark Public Library, November 2, 1917

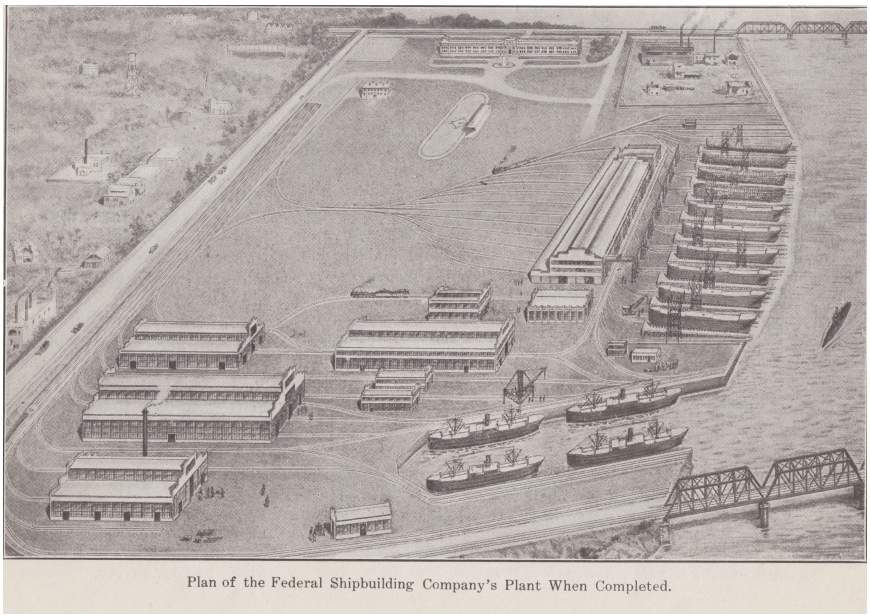
[103] "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270

Yards The site design included three open-air storage yards. The classification yard in the northwest corner was for storing and sorting fabricated materials. The storage yard behind the plate shop was for material requiring on-site fabrication. There was also an assembly yard between the plate shop and the shipways for the assembled materials. The material was moved throughout the yards with 17 locomotive cranes including electric overhead runway cranes. The portable tower shipway cranes were designed and built at the shipyard in conjunction with the American Bridge Company. Others were made by the Erie Steel Construction Company. Standard gauge tracks extended to all shops and down between the building ways. Ten miles of permanent railroad track was laid within the plant.



Shipways under construction 1918

Building Design The yard buildings were designed by the American Bridge Company and cover 10 acres of land. Each department was housed in a separate building. According to a 1918 rendering of the site that was prepared before completion, the original site design included five fabrication shops (the plate shop, forge, machine shop, boiler shop and foundry), seven smaller yard buildings (the mold loft, the power house, joiners shop, sheet metal and general storage buildings, a paint shop and a riggers loft), a train station fronting Central Railroad (not constructed because Central could not provide adequate passenger service on their freight line), a toilet building and a general office building with a fountain and a ball field. A site plan from 1919 shows the plan after construction (without the train station) with additional supporting



Plan of the Federal Shipbuilding Company's Plant When Completed.

Rendering of the Federal Shipyard, 1918, from the Jersey City Chamber of Commerce

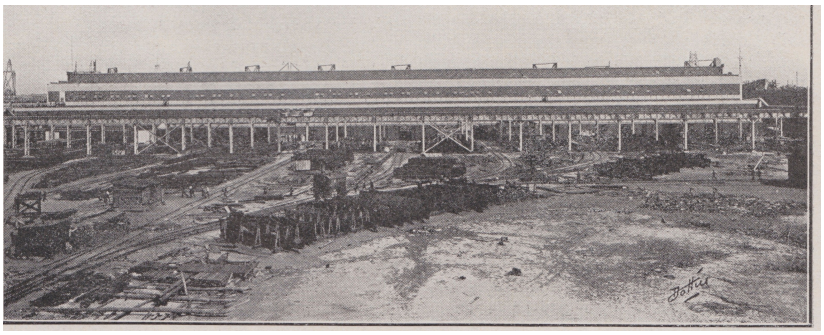


Plate Shop and storage yard west of the plate shop, view facing east. *The Federal Shipbuilder*, February 1920

buildings near the main entrance: four barracks, an emergency hospital, a time office, employment office, a garage, a pay office and a time clock building. A passenger trolley was adjacent to the main entrance. The shipyard had its own fire-fighting and police force of about 20 men, as well as guards who made regular rounds throughout the plant.

The 920-ft. long plate and angle shop of the Federal Shipbuilding Co.'s yard will contain what is said to be the largest plate planing machine in the world. It may be noted in position prior to the completion of the building steel work

Plate Shop, *Iron Age* January 1918

Each yard building was a variation of a standard plan that employed structural steel columns and trusses, poured concrete and brick infill, and large multi-paned, steel-sash windows. This provided uniformity within the site and a modern industrial (less traditional) appearance. The main fabrication buildings were massive; the steel trusses provided a large, unobstructed, well lit workspace with a clerestory roof for production on a single level. The smaller supporting buildings had flat roofs. Many of the buildings had three section stepped parapets that rose above the roof on the front and back sides. The only ornamentation was in the terra cotta copings which were cast with nautical designs.

The yard buildings were consistent with shipyard architecture and engineering that was commonly employed throughout the nation during WWI. The departure from masonry factory construction began in 1904 with the construction of the Packard Motor Car Factory, which was designed by industrial architect Albert Kahn (1869-1942). Kahn is credited with originating the prototype of the modern factory building using structural steel as the defining element with infill glass, brick and concrete.

AB fabricated a large portion of the materials used to construct the buildings at its plants in Trenton, New Jersey, Pencoyd, and Ambride, Pennsylvania. Construction was rushed; certain sacrifices were made to meet the pressures of WWI and to maximize war profits. Ten thousand tons of structural steel with 250,000 rivets were used in the construction. The first shipment of

structural material was delivered on August 28, 1917. Some of the equipment was installed before the perimeters were enclosed. The brick infill is backed by terra cotta blocks.[104]

The building foundations were built by Post & McCord, who also held the contract to build several buildings and were likely responsible for construction of the steel frames. Post & McCord were the iron contractors most noted for the construction of the steel frame of the Empire State Building. They were one of the 29 companies consolidated into the American Bridge Company in 1900.[105] The former marshland required pile foundations; 37,500 timber piles that averaged 50 foot length and 6,500 concrete plies that averaged 36½ feet long were used.[106] Machinery was also set on foundations.[107]

Plate Shop Construction on the main plate and angle shop (920 feet long, 175 feet wide, about 80 feet high) began in December 1917. It is positioned at the head of the shipways parallel to the waterfront. All of the material used in the construction of ships that required on-site fabrication was completed in this building. This two story building was divided into three bays extending the full length and each bay was served by a traveling crane. The plate shop was on the ground floor and housed "the largest plate planing machine in the world" at that time. A "plate and angle furnace" and angle shop was at the north end. The remainder was equipped with fabricating machinery such as Lysholm "punch tables." The second floor housed the pattern and molding department.[108] The name "Federal Shipbuilding and Dry Dock Company" was proudly displayed along the entire length of this building.

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104 "U. S. Steel Enters Shipbuilding Field" The New York Times May 24, 1917; "America's Great Shipbuilding Development" The Iron Age January 3 1918; "History of the Federal Shipbuilding Plant" The Federal Shipbuilder February 1920 vol. 2, no 7 p. 19

105 "List of companies consolidated into American Bridge Company" http://en.wikipedia.org/wiki/List_of_companies_consolidated_into_American_Bridge_Company

106 "U. S. Steel Enters Shipbuilding Field" The New York Times May 24, 1917; "History of the Federal Shipbuilding Plant" The Federal Shipbuilder February 1920 vol. 2, no 7 p. 19

107 "History of the Federal Shipbuilding Plant - Machinery Installation" The Federal Shipbuilder March 1920 vol. 2, no 8 p. 11

108 "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270; "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 15

Mold Loft The mold loft was north of the plate shop. In this building new molds were made for all parts of the ship's structure - including the shell, inner bottom, decks, keel, bulkheads, frames, floors stringers, girders, stiffeners, bounding angles, brackets, clips, etc. The molds included rivet holes and cutting lines. From the molds, "the plates were shaped and laid off, sheared, punched, countersunk, and rolled or bent to the correct form, ready to fit in place on the ship." Prior to WWI, molds and templates were built in place on the ship.[109] Federal was instrumental with the development of this fabrication process.

The Mold Loft *Federal Shipbuilder*, June 1919

Machine Shop The machine shop (500 feet long and 123¾ feet wide) had two 30 foot balconies. It was designed for the manufacture of propelling machinery but was not used for that purpose during WWI. Two overhead electric cranes were in the center bay as were the heavy planers and boring machines which were used to make the stern frames. Lathes and lighter machinery were in the north and south bays.[110]

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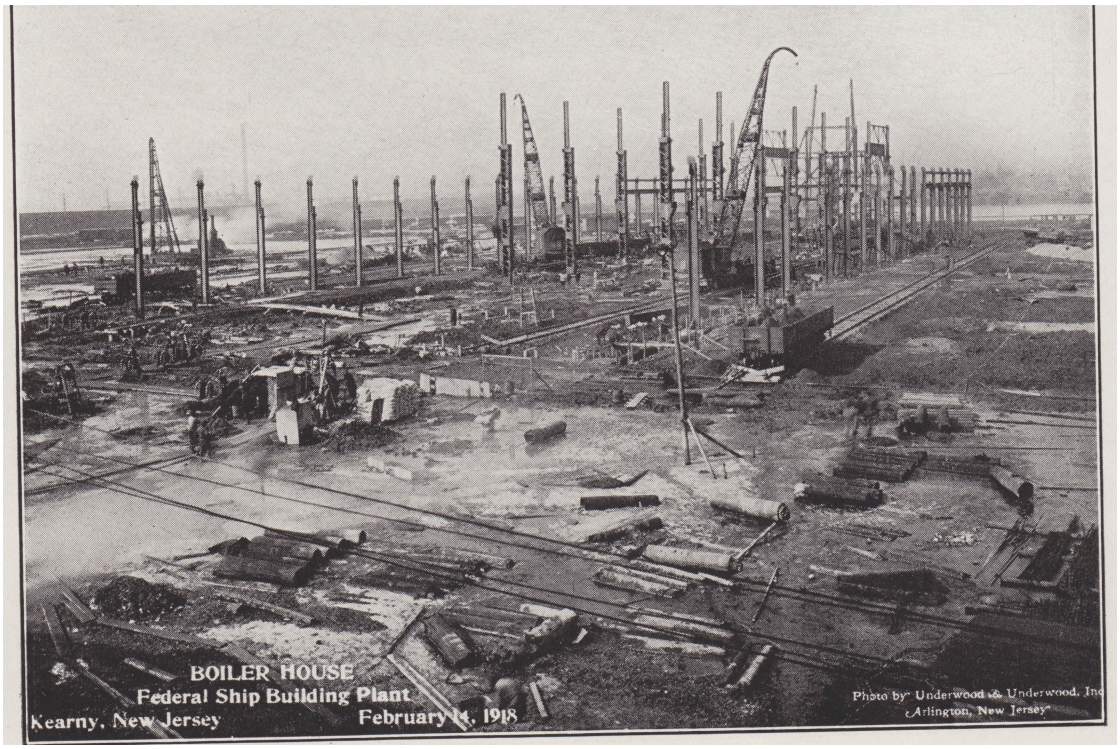
109 "Mold Loft Notes" The Federal Shipbuilder June 1919 vol. 1 no. 11 p. 24

110 "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270

Boiler Shop The boiler shop (500 feet long and 161.5 feet wide) was used for building Scotch boilers and had the capacity to build 175 Scotch boilers a year. The boiler shop is divided into three bays and the center bay was served by three overhead electric traveling cranes.[111] An 85 foot long brick extension was added in 1919.[112]



The Boiler Shop under construction February 14, 1918, *The Federal Shipbuilder*, March 1920

Forge Shop The forge shop (300 feet long and 151 feet wide) was equipped with six Erie steam hammers, riveting machines, a hydraulic press and the die sink department. The center bay was served by an overhead traveling crane.[113]

Foundry The brass and iron foundry (300 feet long x 103 feet wide) had two 12 ton capacity iron cupola furnaces and the equipment to furnish brass castings. The center bay was also served by an overhead traveling crane.

Power House Power was furnished by the Public Service Power station which was located on Kearny Point. The on site power house had five air compressors and three hydraulic pumps.[114]

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111 "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270

112 "New Buildings at Federal Plant" NJ shipbuilding clipping file, Newark Public Library, November 20, 1919

113 "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270

114 "Yard of the Federal Shipbuilding Company" International Marine Engineering April 1919 pp. 266-270

General Office Building The administration building (420 feet long and 55 feet wide), which fronts Lincoln Highway, does not conform to the industrialized appearance of the yard buildings. This two story building was traditionally designed in the Neo-classical style with a defined base, mid section and cornice. The exterior is clad in brick and the windows grouped in bays of three. The slightly projected entrance is defined with columns and a stepped entablature; maritime

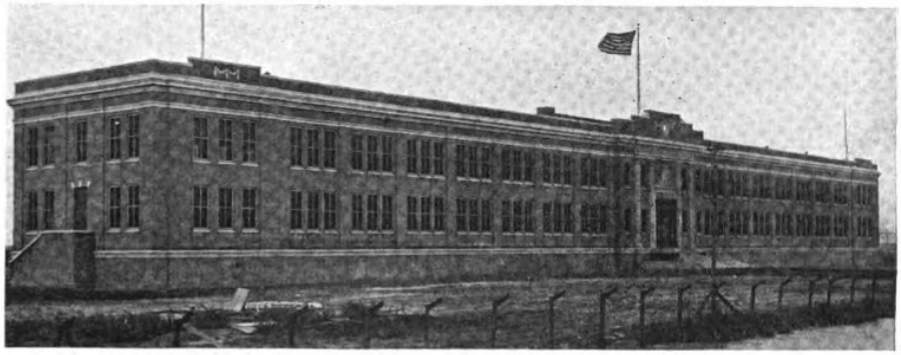

Fig. 10.—General Office Building

General Office Building, *International Marine Engineering* 1919

themed sculptural friezes flank the cornice and parapet. A little bridge crossing the Morris Canal once provided access from Lincoln Highway. Administration offices were on the first floor and the engineering department was on the second.

Other The employment and time offices, barracks, gate house and pay office were frame construction.[115]

Early Years (1917 to 1920)

The years 1918 and 1920 were devoted to building the standard fabricated ships for the US Shipping Board. For these ships, Federal functioned as a fabrication yard with about 60% of the steel needed for each hull fabricated off site by the American Bridge Company. As mentioned, the contract was for thirty 9,600 ton cargo ships that burned either oil or coal and were capable of maintaining a speed of 11 knots per hour. The first five keels were laid in 1917. The following quote from January 1918 projected a promising turnout:

> "[the Federal Shipyard] has made more substantial progress than any of the new privately-owned plants, having laid five keels to date. The first ship will be ready for the government in June and after that the Federal yard expects to deliver a completed ship every two weeks."[116]

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115 "Extension Planned of Ship Yard Plant" NJ shipbuilding clipping file, Newark Public Library, April 23, 1918

116 "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 125

Delays in rail transportation, workers shortages and a bad winter impeded progress. Only 1,500 men were employed in the plant in March of 1918.[117] But by the summer of 1918, probably about 7,500 were employed. The first 10 ships built at Federal took 285 days on the shipways and 86 days in the fitting out basins for a total of 372 days. Only three ships were completed at Federal in 1918 before WWI ended.

Launching the *Liberty,* 1918

Its first ship launched - the *Liberty* - was the first steel ship delivered to the US Shipping Board from an Atlantic Shipyard.[118] *Liberty* was a 9,600 ton, single-screw, turbine steamer with a loaded displacement of 13,125 tons and a 28-foot loaded draft. She was 410 feet long and 55 feet wide; her steel was rolled in the Homestead Mills at Homestead, Pennsylvania. Her power was provided by three Scotch marine boilers that transmitted 2,800 horsepower to the turbines that turned the single-screw propeller and enabled a speed of 11 knots.[119] *Liberty* remained in service until WWII but was torpedoed and lost in 1942.[120]

Ship launchings were accompanied by celebrations. Ships were named by Mrs. Woodrow Wilson and were christened by female associates. The *Liberty* was christened by Mrs. Elbert H. Gary, wife of the chairman of the board of US Steel, at its launching festivities. Workmen cheered from the shipway scaffolding. Federal launched its second ship named *Federal* in August 1918 which was christened by Catharine Farrell, the daughter of James Farrell, President of US Steel. Charles Schwab, who at that time was the general manager of the Emergency Fleet Corporation, attended the ceremony. Governor Edge spoke at the launch of Federal's third ship, *Piave,* in September of 1918, declaring "we are winning the war." *Piave* was named for an Italian river that was the site of a recent victory.[121] The ship *Federal* remained in service for

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117 "Federal will Launch its First Ship in Two Months" Jersey City Chamber of Commerce March 1918 p. 27

118 "Eight Ships Delivered" Plain Dealer Cleveland Ohio Oct 17, 1918 p. 14

119 "Freighter Liberty Takes the Water" NJ shipbuilding clipping file, Newark Public Library, June, 26 1918

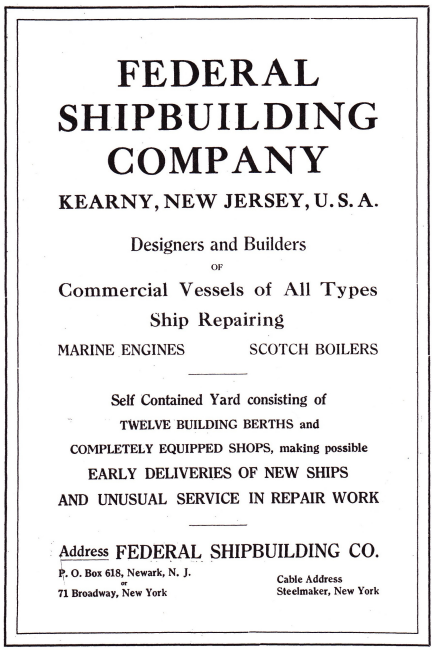
120 "Federal Shipbuilding, Kearny and Newark NJ" http://shipbuildinghistory.com/history/shipyards/1major/inactive/federal.htm

121 "To Lunch Another Ship at Kearny" Jersey Journal (Jersey City, NJ) August 7, 1918 p. 4; "Piave Launched At Shipyards" Jersey Journal (Jersey City, NJ) September 7, 1918 p. 2

nearly 27 years and was lost by bombing in 1945; *Piave* was "wrecked in the Goodwins" in 1919.[122]

In May of 1918, the company considered enlarging its plant by developing a site directly opposite the shipyard on the east bank of the Hackensack River in Jersey City (between Lincoln Highway and the Newark and NY Railroad Bridge). Twenty one acres of land that were owned by Jersey City - 16 of which were under water - were purchased at a public auction for $80,000. Two additional tracts adjoining the first were purchased in June of that year for a total of 100 acres. Despite the $8 million contract for the plant's construction, the expansion did not materialize.[123]

Federal's wartime contract was completed in November of 1919 - one year after WWI ended - after which Federal concentrated on shipbuilding for private commercial companies. Unlike some of the other wartime shipyards which built light wooden buildings, Federal was designed for "permanency." US Steel conceptualized building a shipyard before the war began and created a platform for a variety of projects. Federal's incorporation papers describe its purpose to build "vessels, aircraft, submarines, bridges, etc".[124] The plant was adaptable to building all classes of ships and machinery, including tankers and passenger ships. It held the capacity to employ roughly 8,000 and produce 24 vessels annually.



Advertisement from 1920 in *Port of New York Annual*, Smith's Port Publishing Co.

The 27 cargo ships delivered to the US Shipping board in 1919 equaled 5½% of the total steel merchant ships built in the US in that year. Federal was also awarded a contract to design and build 13 ships for the U. S. Steel Products Company - a subsidiary of U. S. Steel, which exported the products of Carnegie Steel, American Bridge Company and other affiliates to foreign countries.[125] The first two private ships, *Steel Age* and *Steel Maker,* were launched in December 1919; the remainder were launched in 1920. Federal also built a freighter and a tanker for the Freeport Sulphur Transportation Company and a 15,000 ton tanker for the

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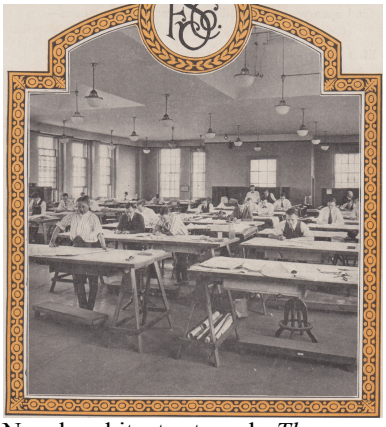
122 "Federal Shipbuilding, Kearny and Newark NJ" http://shipbuildinghistory.com/history/shipyards/1major/inactive/federal.htm

123 "Buys Site for Shipyard" The New York Times May 11, 1918; "Shipbuilding company Take More Titles" Jersey Journal (Jersey City, NJ) June 4, 1918 p. 10; and "Leviathians to be Built in Jersey City" Jersey Journal (Jersey City, NJ) September 3, 1918 p. 1

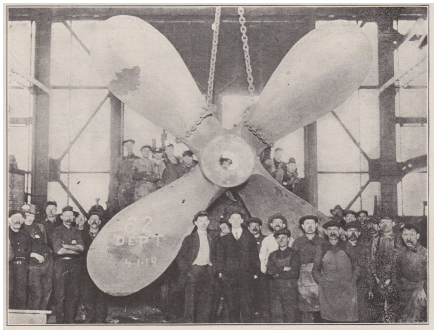
124 "U. S. Steel Backs New Shipyard Co.," The New York Times July 24, 1917

125 The Federal Shipbuilder Jan 1920 vol. 2. no. 6 p.14

Standard Oil Company of New Jersey. At that time it was the largest ship of any kind every built in the Port of New York.[126] *Steel Age* took 134 days to build. The *SS Bellemina,* the last ship delivered to the US Shipping Board, was launched in Oct 1919 in just 89 days from the laying of the keel, and was considered to be a construction record for the boat size in an Atlantic coastal plant.[127] *Steel Age* and *Steel Maker* were torpedoed in 1942 during WWII. *Bellemina* was scrapped in 1959 after years of service.


Naval architects at work ,*The Federal Shipbuilder,* October 1919

After the war, Federal expanded its capability to fabricate custom ships. It had a complete estimating, design and engineering staff which included naval architect John C. Craven. About 1,000 separate drawings were required to build a ship with a fabricated plan. Constructing ships for private firms involved "nearly twice the work" in most departments as the standard ships that were built for the EFC. There was nearly "twice as much structural steel," "over twice the number of rivets," "more caulking" and "more accurate work in all details."[128] By March of 1920, Federal had orders for twenty ships of five different types. During WWI the whole yard was working on ships of one model.


May 1919 *The Federal Shipbuilder*

After the war, the company became more independent from outside fabricators as the forge shop, machine shop and foundry increased production for each succeeding ship. During the war, 60% of the ship's components were outsourced to a fabricated steel shop. After the war, most components were fabricated on site. Federal built its own boilers, propelling machinery including turbines and reciprocating engines, and made all of its castings. In addition to building the boilers for the ships built at Federal, the company also contracted to build boilers for outside concerns. One hundred three boilers were made in 1919, 17 of which were sold to other shipyards. Federal's boiler shop was the largest in the country at that time.

After WWI, Federal began upgrading its plant. The highest quality machinery was acquired, often to replace machines that were purchased under war pressure. This was considered "intelligent spending" as the company believed in the use of the best equipment for efficiency to

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126 "Shipyard Fire Does $1,600,000 Damage" The New York Times May 19, 1924; Smith, 1920 p. 276

127 "Federal Launching Makes Record" NJ shipbuilding clipping file, Newark Public Library, October 4, 1919

128 "The Federal Shipbuilding Company on a Peace Time Basis, 1920" The Federal Shipbuilder January 1920 vol. 2, no. 6 p.7

compete on a world market.[129] To facilitate repair work, including hull and engine repair and rebuilding, Federal built a large floating drydock capable of lifting a 9,000 ton/500 foot long vessel.[130] Two of the shipways were dismantled to make room for equipment. In 1923, Federal was awarded the contract to recondition three steamers that had been built during WWI at Hog Island.[131] In 1930, Federal reconditioned 5 EFC vessels for the Baltimore Mail Steamship Company. These ships were made longer and faster. Federal also rebuilt and repaired locomotives and railway cars.[132]

Housing and Transportation

Prior to WWI the Newark Bay was known for its mosquitoes and marshland. Within a year, the area was transformed into a center of war production. In 1918, the three major shipyards employed approximately 24,000 men; about 12,000 were employed at the Newark Submarine Boat corporation; 4,500 were at the Foundation Company; and 7,500 were at the Federal Shipbuilding Company. In addition to the shipyards, other area factories were enlarged or constructed to serve the war effort. Among these were the International Arms & Fuse Company, which employed 9,200 in North Newark, and Western Electric Instrument Company on Kearny Point.[133] In December of 1917 it was estimated that homes for 40,000 workman and their families would be required.[134] This tremendous influx of workers within a short time put a strain on the housing and transportation infrastructure.

The housing and transportation problems of the Newark Bay area were similar in every city with new or expanded shipyards. The problem was compounded by the fact that many of the shipyards were built in isolated areas that previously had been non-accessible. This was the case for the Submarine Boat Corporation, which had no direct means of local transportation. Kearny Point was served by a street car (trolley) which extended from Newark to Jersey City along Lincoln Highway and connected with the Hudson & Manhattan Railroad terminals (today's PATH subway system, also known as the "Hudson Tubes," which was completed between Hoboken and Manhattan in 1908, Jersey City and Manhattan in 1909, and Newark and Manhattan in 1911) or ferries for access to NYC. The trolley quickly became overburdened.[135]

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129 "The Federal Shipbuilding Company on a Peace Time Basis, 1920" The Federal Shipbuilder January 1920 vol. 2, no 6, p. 6

130 Smith, 1920 p. 276

131 "Repair Awards to Increase Federal Ship Work Basis" NJ shipbuilding clipping file, Newark Public Library, November 16, 1923

132 "Shipyard in New Stir as Work Mounts" NJ shipbuilding clipping file, Newark Public Library, no date

133 "How Public Service Railway is Helping Build Ships in Newark Vicinity" Electric Railway Journal vol. 52 July to December 1918 McGraw-Hill Company New York City

134 "First Keel is Laid in Big Newark Yard" The New York Times December 21, 1917.

135 "How Public Service Railway is Helping Build Ships in Newark Vicinity" Electric Railway Journal vol. 52 July to December 1918 McGraw-Hill Company New York City

The Emergency Fleet Corporation program "was threatened with failure because of the inability to find homes" and transport workers in shipyard cities throughout the nation. In March, 1918, Congress approved $50 million for the Emergency Fleet Corporation to spend on housing projects in shipyard cities.[136] The cost of a housing project was divided between the corporation and the shipbuilding company. "The shipbuilding company was required to buy the land necessary for a housing project at its own cost and to place the title to such land in a realty company to be incorporated and owned by or in the interest of the shipbuilding company." The Emergency Fleet Corporation would provide a 5% interest loan to build the project.[137] Twenty four separate housing projects were carried out by this plan. Completed by December 1918 were 8949 individual homes, 1119 apartment buildings, 19 dormitories and 8 hotels for 27,732 workers and their families.[138] In some cities, the Emergency Fleet Corporation acquired the land. Housing projects built on land owned by the corporation included those for the Bethlehem Shipbuilding Corporation at Sparrows Point, Maryland, at the Hog Island yard in Philadelphia and at the Merchant Shipbuilding Corporation in Bristol, Pennsylvania.[139] At Hog Island, barracks were built for 10,000 workmen with separate housing facilities for the executives and office employees, a movie theatre and a YMCA.[140] At US Steel's Chickasaw Shipbuilding plant in Alabama, two villages were planned; one for African-American workers and one for white workers.[141] Four frame barracks were built at the Federal shipyard in 1918. They were located near the entrance and behind the general office building and are shown on the site plan from 1919.

Kearny Point is nearer to the residential areas of Jersey City than it is to the Kearny Uplands. Jersey City was experiencing a labor shortage in 1918 and aimed to house the 12,000 shipyard workers and their families for want of the increased tax revenue and the new businesses that it would bring. The EFC requested that the Jersey City Chamber of Commerce conduct a survey of the housing, transportation and potential developmental sites. Two thousand rooms were found available for boarding, but most of Federal's employees were married men with families and boarding only served as a temporary measure. Six hundred eighty vacant apartments were located, but these were either older "tenements" or were far from the shipyards. The conclusion was "there were practically no housing accommodations in Jersey City for the shipbuilders and their families." In February 1918, Federal incorporated the "Federal Homes Company" with the intent to build homes in Jersey City for the men who worked at the Federal and Foundation

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[136] Mattox, 1920 p. 140

[137] Ibid pp. 141 and 144

[138] Ibid p. 147

[139] Ibid pp. 141 and 144

[140] "America's Great Shipbuilding Development" The Iron Age January 3, 1918 p. 16

[141] "Federal's Sister Yard Described" The Federal Shipbuilder February 1920 vol. 2, no 7, p. 6

Company shipyards. Fifty permanent twenty-family brick apartment houses with three to five room units with heat and hot water were conceptualized.[142] If located in Jersey City immediately across river, it would be served by a "ferry." This project was backed by the Jersey City Chamber of Commerce but it did not receive the necessary aid from the Emergency Fleet Corporation.[143]

For the most part, housing was found throughout the New York metropolitan area. In 1918, about 85 percent of the Federal and Foundation Company employees and two-thirds of the employees of the Submarine Boat Company commuted from Manhattan or east of the Hudson River.[144] A newspaper article from 1919 states that of the 7,000 employees at that time about 1,500 employees lived Newark, about 1,500 in New York City and the remainder lived in Jersey City, Bayonne and Hoboken.[145] There were no direct roads or public transportation from Kearny Uplands.

A separate appropriation of $20 million by Congress was intended to extend existing transportation facilities to shipyards by making loans available for public utility companies. The Emergency Fleet Corporation purchased street cars for 17 yards; street railway extensions and loops were built at 27 other yards, steam railroads were built at 26 yards, and steamboats were purchased for 20 shipyards. The EFC also worked to revise schedules to suit the yard workman. With the result of improved passenger transportation, "125,000 more shipyard employees" were transported daily than would have been possible before the improvements were made.[146]

In the Newark Bay area, the Emergency Fleet Corporation financed a $1 million project to extend the Public Service street lines to the shipyards. This involved laying new tracks from Wilson Avenue in the Ironbound section of Newark to the Submarine Boat Corporation and improving the fare collection and traffic congestion at the Federal Shipbuilding Company. A new prepayment loading terminal, a passenger bridge over Lincoln Highway, and a new car shop was added at the Federal Shipbuilding Company. Eighteen new cars were purchased. With these improvements trolley transportation was available to access the Hudson Tubes and all parts of Newark and Manhattan. According to a New York Times article, a larger transportation project, which would have extended the Hudson Tubes and opened a new terminal at the Federal

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142 "Federal Homes co. to Build Fifty Houses" Jersey Journal (Jersey City, NJ) February 2, 1918 p. 10

143 "City to Give Every Aid to Shipyard" Jersey Journal (Jersey City, NJ) April 19, 1918 p. 1 and 4. and "Federal Government must Finance Housing Problem for Ship Building Employees" Jersey City Chamber of Commerce vol. 5, no. 1 January 1918

144 "How Public Service Railway is Helping Build Ships in Newark Vicinity" Electric Railway Journal Vol. 52 July to December 1918 McGraw-Hill Company New York City

145 "Rotarians Told of Records Made at Kearny Shipbuilding Plant" NJ shipbuilding clipping file, Newark Public Library, August 13, 1919

146 Mattox, 1920 pp. 145-146

shipyard entrance, was proposed in lieu of a government sponsored housing project. This did not materialize.[147]

After the war, in 1920, Federal purchased the 11-acre "Peter Henderson farm in Jersey City" to build 50 to 75 middle class homes for its superintendents and foreman and financed the construction of roads, waterlines and sewers. The site is located on the west side of John F. Kennedy Boulevard between Audubon and Culver Avenues. The stuccoed and shingled frame homes were planed to have from 6 to 8 rooms and were on 40' x 100' lots. The price varied from $6,500 to $8,000; employees were required to place 10 to 15% down and have the balance deducted from their salaries over a 10 to 12 year period.[148]

Health and Safety

The Emergency Fleet Corporation included a safety engineering department which aimed to prevent worker accidents through education and the use of safety equipment such as eye goggles. The Federal Shipyard was built with an emergency hospital with a surgeon. Accidents did occur frequently including accidental deaths. In 1919, the 37 year old workmen, Stephen O'Connor, was crushed by a 1000 pound steel plate. The plate was being lowered by a derrick and broke loose, crushing O'Connor, who died instantaneously.[149]

Middle Years (1920 to 1939)

The early 1920s saw a decrease in the nation's shipbuilding industry compared to that of 1919, but the output in 1921 was still far greater than the prewar years. The sharpest decline was in 1922 and the nation's output dropped far below that of Great Britain and Germany. In 1919 American yards produced 57% of the world's tonnage. In a steady decline, by 1922, it only

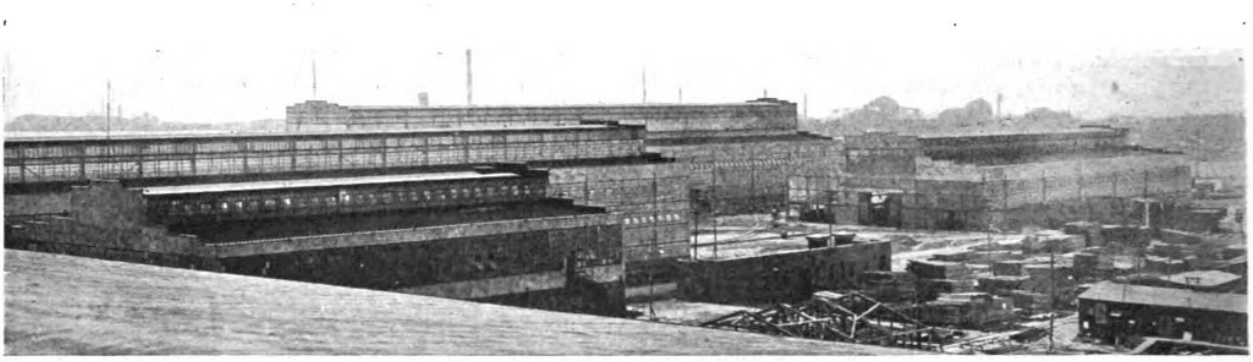

Fig. 1.—General View of the Principal Shops at the Federal Yard, Taken from Roof of Fabricating Shop. Joiner Shop and Machine Shop to the Left. Boiler Shop in Center. Forge Shop and Lumber Storage to the Right

International Marine Engineering 1919

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147 "Hudson Tube Lines will be Extended" The New York Times April 3, 1918. "How Public Service Railway is Helping Build Ships in Newark Vicinity" Electric Railway Journal Volume 52 July to December 1918 McGraw-Hill Company New York City

148 "Federal's Sister Yard Described" The Federal Shipbuilder February 1920 vol. 2, no 7 p. 8

149 "Heavy Plate Kills Kearny Ship Builder" *Jersey Journal* (Jersey City, NJ) p. 1 April 10, 1919.

produced 5% of the world market. The American Bureau of Shipping wondered if the shipbuilding industry in the US would become a lost art and what would become of the shipyards built during WWI. Many had closed by 1922.

Despite the nation's trend, Federal remained busy. Federal aimed to reduce the cost of shipbuilding so that American owners would buy in this country and not look at foreign manufacturers. It also believed in good employee relations. In April 1922, Federal won the $850,000 bid to build two cargo and passenger steamers for the Merchants and Miners Transportation Company. These ships were designed to accommodate 200 first class passengers and haul 6,000 tons.[150] By that time, Federal had reduced its number of employees but repeated want ads appeared in *The Jersey Journal* throughout 1922, advertising a "good rate of pay," "overtime," "winter work" and "guaranteed steady work [for] first class men." Federal also repaired vessels. By 1924, Federal ranked among the best shipbuilding yards in the world.[151]

After WWI, the trend was towards larger merchant vessels - from 10,000 to 14,000 tons and greater, which was within Federals' capacity. It was still cheaper to transport freight by water than by rail. The vessels under 10,000 tons were shown to be a poor financial investment. The operating costs of the larger vessels was slightly more, but these ships could carry several thousand tons of additional cargo with lower rates. To launch the larger ships, the depth of the Hackensack River channel had to be increased. Its 20 foot depth was marginally sufficient for the EFC ships, but larger ships would draw up to 30 feet of water and the shipways were 35 feet

Fig. 2.—General View of Shipways from Fitting-Out Basin

International Marine Engineering 1919

deep. When a ship was launched, the oil was removed to make it lighter and then towed

150 "Local Port News and Ship Activity" The Sun (Baltimore, Maryland) April 20, 1922 p. 19

151 "Shipyard Fire Does $1,600,000 Damage" The New York Times May 19, 1924

downstream to refuel in deeper waters. Even with this, the ship would sometimes rasp the bottom.[152] A 35 foot deep channel through Newark Bay with a 30 foot channel into the Hackensack River was backed by the Jersey City Chamber of Commerce desiring to commercially develop its western shore. Newark desired a world port and in 1921-22 funded dredging a channel in the Newark Bay with municipal bonds. This channel was later widened by the federal government and extended up river.

Federal also attained contracts to manufacture the components for steel bridges. A fire that occurred in 1924 destroyed the "molds for the construction of sections for a bridge" for the Central Railroad of NJ that was to replace a railroad bridge crossing the Newark Bay.[153] This apparently was the bridge adjacent to southern end of the plant.

Dixie was commissioned by the Southern Pacific Steamship company for $2.6 million. Delivered in January 1928, *Dixie* was considered to be the "most advanced steam driven ship afloat" and the largest of its kind in the Newark District. This combination passenger and cargo ship had accommodations for 271 first-class passengers, 54 third class passengers and 110 crew members, hot and cold fresh and salt water, a luxurious smoking room, a dance floor, observation room, three passenger decks and could carry 5,500 tons of cargo.[154] *Dixie* was scrapped in 1950.

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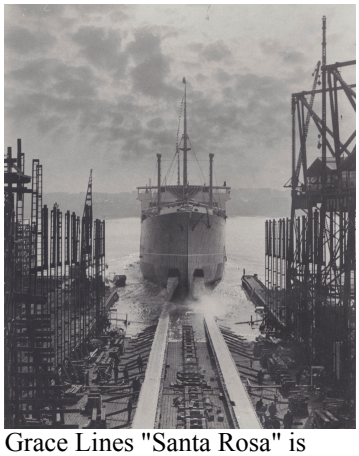
152 "Senate Committee Here to Inspect Waterfront" Jersey City Chamber of Commerce January 1921 p. 17

153 "Million Loss Fire Estimate at Ship Plant" NJ shipbuilding clipping file, Newark Public Library, May 18, 1924

154 "Newark District's Largest Ship is Christened by Ice and Sleet" NJ shipbuilding clipping file. New Jersey Reference room, Newark Public library Library, no date



Grace Lines "Santa Rosa" is launched after being refurbished in 1932

Electric welding was considered by the Emergency Fleet Corporation as a means to save time and money. Welding had been used previously on small jobs and repairs, but it had not been used to build hulls previously in this country. It was, however, known to have been used in Germany. In May 1918, Federal conducted a government authorized test that involved building the 40 foot mid-section of a 9,600 EFC ship with welded seams and the remainder with rivets and then fill the hull with water to examine its durability. The process involved spot welding to assemble the 40 foot section and arc welding to complete the seams. The test was successful. Welding saved the time of the templet maker, punching the holes and the work of the fitter, and was believed to save $100,000 of the cost of a 10,000 ton vessel.[155] Advertisements for ship work employment in 1922 lists openings for "electric welders" on the same add that lists "riveting gangs," suggesting that both methods of joinery were being used at that time.[156]

In 1930, Federal only had about 1,300 employees. But in 1931, Federal received a contract to build 4 ocean liners for Grace Lines and four ships for the Panama Mail Steamship Company, which required hiring 3,000 additional men. These ships took two years to build.

1934 *G. M. Hopkins* vol. 2 Atlas of Hudson County plate 29

In 1933, Federal received its first postwar naval contract which was for two destroyers called *Flusser* and *Reid.* Each cost $3.4 million and were launched in 1936."[157] These ships were fitted with a new type of steam-turbine power plant that was developed from 13 years of testing and research. According to Vice Admiral Harold G. Bowen, who was in charge of Federal during part of WWII, "Federal's work on high-pressure turbines introduced a new type of engineering which helped the Navy become the best engineered in the world."[158] The Navy commission was part of a

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155 "Plan Rivetless Ships" Plain Dealer Cleveland Ohio Oct 21, 1918 p. 9; "Electric Riveting Test on ship Soon Coming" NJ shipbuilding clipping file, Newark Public Library, May 3, 1918

156 "Ship Workers" Jersey Journal (Jersey City, NJ) October 31, 1922 p. 21

157 "By U. S. Navy Hopes for Strong Sea Forces" Trenton Evening Times (Trenton, NJ) September 1, 1933 p. 1

158 "Federal Shipyard Sale Revives Memories of Wartime Service" NJ shipbuilding clipping file, Newark Public Library, April 25, 1948

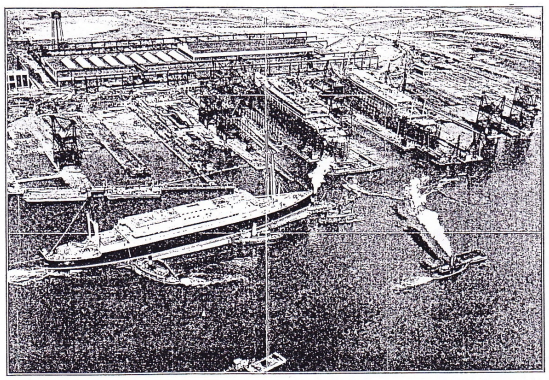
shipbuilding program that involved the construction of 37 naval ships in both private and government yards. By Federals' 20th year (1937), a total of 115 vessels (over 1 million tons of steel) had been constructed in Federal's Kearny Point yard.[159]

World War II (1939-1945)

WWII began September 1st 1939 when Germany invaded Poland. Britain and France declared war on Germany two days later. America chose to remain neutral, isolating itself, as it did during WWI, fearing that participation could weaken and jeopardize her basis as a free republic.[160] This changed with Japan's attack on Pearl Harbor. On December 8, 1941, America declared war on Japan. On December 11, 1941, Germany and Fascist Italy declared war on America. America remained at war until Victory Day, May 7, 1945.

World War II brought the most ambitious shipbuilding program in American history. In 1938, to prepare for the possibility of war, Congress authorized expenditures to increase the Naval fleet by about 21 percent. Between 1938 and 1945, a total of $590 million was expended for construction and improvements at yards building Navy ships. The federal government commissioned battleships, cruisers, destroyers, aircraft carriers, landing craft, and other vessels to replace the Pacific Fleet destroyed at Pearl Harbor and build up its navy. By 1946, more than 2,000 ships were deployed.

In addition to the Naval program, the U.S Maritime Commission undertook an emergency shipbuilding program. Like the Emergency Fleet Corporation, the Maritime Commission did not commission destroyers or battleships; it commissioned nearly 6,000 simple cargo ships to carry troops and materials to the allies. The cargo and troop ship known as the *Liberty Ship* was designed for capacity (approximately 10,000 tons) and rapid construction. Sixteen American shipyards built 2,751 Liberty ships; this was the largest number of ships ever built from a single design.[161] The Maritime Commission also funded yard expansion and the construction of new yards.[162]



1939

During WWII, Federal built ships for both the US Navy and the Maritime Commission. The phenomenal total of 300 ships built between 1939 and V-day were built at a cost exceeding $1

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159 "Federal Shipyard Marks its 20th Year in Kearny" NJ shipbuilding clipping file, Newark Public Library, no date

160 Doenecke 1982 p. 201

161 "Sun Shipbuilding and Dry Dock Company. Historical Marker" http://explorepahistory.com/hmarker.php?markerId=1-A-2EB

162 "Emergency Shipbuilding Program" http://en.wikipedia.org/wiki/Emergency_Shipbuilding_program

billion and included 83 cargo and troop ships for the Maritime Commission and 217 war ships for the Navy. The Navy ships included 71 destroyers, 52 destroyer escorts, and 78 landing crafts. To accomplish this feat, Federal expanded its capabilities by enlarging the Kearny plant with $10 million from the Navy. It also built a second yard in Port Newark with government assistance. Between 1939 and 1945, with L. H. Korndorff president, Federal "reached its greatest acclaim as the phenomenally fast builder of sturdy, durable craft."[163] During its peak, a Navy fighting ship was delivered every five and a half days due to Federal's use of the most modern shipbuilding techniques and assembly line methods.[164]

The $10 million renovations involved dredging a new wet basin and building what appears to have been a new double shipway on a 15 acre tract immediately north of the original yard that was once owned by the Passaic Zinc company. Two old ways were reconditioned. Two new reinforced concrete storage buildings, a new brick building to house the Naval architectural and engineering departments, a hospital, pipe shop, and an addition to the mold loft were constructed. The new engineering building was located in place of the former dormitory buildings. The storage buildings were located in place of the former open air storage yards and were built by Walter Kidde Contractors of New York. Both were used for storing fabricated and finished

1945 Federal Shipbuilding & Dry Dock Co., Kearny, New Jersey looking west, 22 May 1945

materials and equipment used in assembling the ships; one is a four story building with a 20,000 pound elevator; the other is an adjoining one-story, saw-tooth roof building with two cranes for

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[163] "Federal Shipyard Sale Revives Memories of Wartime Service" NJ shipbuilding clipping file, Newark Public Library, April 25, 1948

[164] "A. McMullen Dies; A shipbuilder, 65," The New York Times November 26, 1947

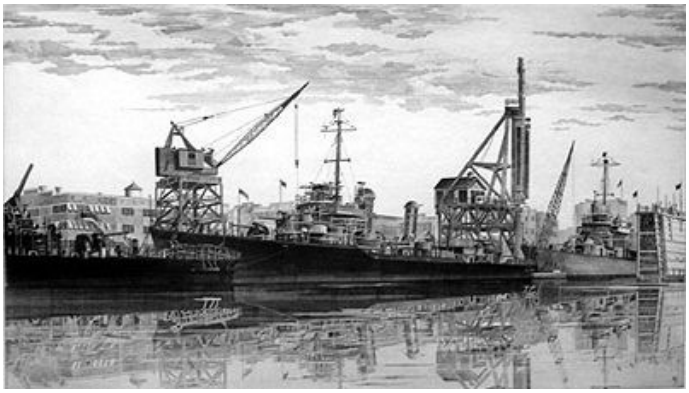
storing heavier equipment.[165] The $200,000 mold loft extension was built by the American Bridge Company.

By January of 1941, more than 10,000 were employed at the shipyard and about 500 new employees were hired each week. By August 1941, 17,000 workers were employed.

Women began to be hired in 1942. By May 1944, 1,700 women worked at the Port Newark Plant. Many began as helpers, but some rose to the level of a third class mechanic. At the peak of war production, 52,000 were employed, which included 29,600 in Kearny and over 10,000 at the Port Newark Yard. As in WWI, union strikes demanded use of union workers. This forced a Navy takeover for about 6 month beginning on August 23, 1941.

The first cargo vessel *S.S. Challenger* was delivered to the Maritime Commission on July 1, 1939. Federal built both cargo and troop ships throughout the war and was the first to build the C-4 troop ship, which was designed to accommodate 6,500 men. This ship had no portholes to prevent light from leaking out and instead had an extensive ventilation system.[166] The contracts for several troop ships were canceled after the war ended, but cargo ships were built until 1947. The largest non-combat vessels built at Federal were the eleven, 20,000 ton troopships and were the largest built in the country at that time.

The first destroyer *Benham* was delivered to the Navy on April 18, 1939. In 1942, Federal began building a new type of "super destroyer" that was fast and highly maneuverable. During WWII, Federal produced 22% of all the destroyers built for the Navy in a U. S. shipyard and built more destroyers than any other builder except Bath Iron Works.[167] The *USS Jenkins,* a destroyer that saw action in both the Atlantic and the Pacific Ocean and traveled "124,447 miles

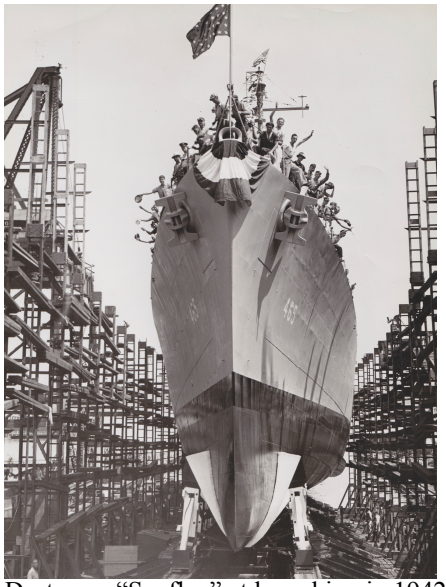


1942. Destroyers in Wet Basin at Federal Shipbuilding and Drydock Company, Kearny, New Jersey

[165] "Federal Ship Expands Plant" NJ shipbuilding clipping file, Newark Public Library, January 18, 1941

[166] "Shipyard Bid $3,557,000" NJ shipbuilding clipping file, Newark Public Library, November 1, 1963

[167] Ibid; Federal Shipbuilding Incorporated Former Site. http://wikimapia.org/6046692/Federal-Shipbuilding-Incorporated-Former-Site


Destroyer "Saufley" at launching in 1942

without an over-hall," was noted as being one of the "most impressive records of the war." The largest warships were 6,000 ton cruisers.[168] The last destroyer built for the U.S. Navy was named *Epperson* and delivered in March 1949. It was sold to Pakistan in 1977 and remained in service until 1990.

The *USS Juneau,* which was named for Alaska's capital city, was a 6000-ton cruiser launched October 1941 for the US Navy. In November 1942, *Juneau* was hit by two Japanese torpedoes and sank at the Naval battle at Guadalcanal in the South Pacific; 687 men that were on board were killed; only 10 men survived.[169] A second *Juneau* was built in her honor with a lower silhouette to offer less of a target and the ability to "hit harder" and "see further" than its predecessor. It was launched in July 1945 and was scrapped in 1960.[170]

The Port Newark Yard

In order to expand capacity, the old WWI era shipyard of the Submarine Boat Company in Port Newark was renovated into Federal's satellite yard. The $20 million renovations were financed by the Navy and work began in January 1942. The Walter Kidde Construction Company was the contractor in charge. The 12 old shipways were dismantled below the waterline and new shipways were constructed on the original pile foundations. Revolving cranes with a 32 to 50 ton capacity were installed on tracks between alternate shipways. A new plate shop (525' x 254'), sheet metal and pipe shop (380'x 142'), machine shop (191' x 528'), a four story office and store building (400 x 219'), and a powerhouse (180 x 85') were all built on timber pile foundations. The buildings were steel frame construction with masonry curtain walls, except the office building which was reinforced concrete with brick curtain walls.[171]

The Port Newark yard was used between 1942 and 1946. Construction of the first ship began in July 1942 and was launched 4 months later. In the four year period 140 vessels were built at the satellite yard, which included 78 landing craft, 52 destroyer escorts, and 10 destroyers.[172] The landing craft was a new type of ship used to carry infantry from sea to shore during an

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168 "Federal Shipyard Sale Revives Memories of Wartime Service" NJ shipbuilding clipping file, Newark Public Library, April 25, 1948

169 "USS Juneau (CL-52)" http://en.wikipedia.org/wiki/USS_Juneau_(CL-52)

170 "New Cruiser Juneau Stronger Than First" *Omaha World Herald* (Omaha, Nebraska) p. 8 July 16, 1945.

171 Department of the Navy, 1940-46 p. 390-391

172 "Federal Shipbuilding, Kearny and Newark NJ" http://shipbuildinghistory.com/history/shipyards/1major/inactive/federal.htm

amphibious assault. Destroyer escorts were smaller, lightly armed warships used to escort convoys of merchant marine ships. They typically lacked the arms, armor and speed to attack fast armored cruisers and battleships. During WWII Federal built 10% of all destroyer escorts produced in the nation.[173]

The Second Housing Crisis

By January 23, 1941, 11,000 were employed at Federal in Kearny. Wages averaged 87 cents an hour, which amounted to about $34 to $35 a week. Rents were as high as $50 a month and some apartments did not have hot water. Some set up "trailer camps." Workers commuted from as far as Long Island, New York and Stroudsburg, Pennsylvania. The union called for the construction of workers' housing. Less than 12% lived in Kearny; most resided in Jersey City, Bayonne, Newark and the Newark suburban area. Conditions were the same surrounding other busy yards, like those in Camden, New Jersey and Quincy, Mass.[174] A 1000-unit, $3.5 million permanent housing development was authorized by Congress as part of the slum clearance program.[175] The location and extent to its construction is not known.

Important Company Personnel

John C. Craven was a naval architect employed at Federal from its founding. Craven was born and educated in England and emigrated to the US in 1901 after training at the Birkenhead Technical Institute. The December 1903 issue of *Marine Engineering* lists Craven as "hull draftsman" at the Crescent Shipyard in Elizabethport, New Jersey. Craven also worked for the Perth Amboy Shipbuilding Company, the Fore River Shipbuilding Company and was placed in charge of ship design at Newport News Shipbuilding and Drydock Company. While at Federal, Craven was a leader in adopting the use of welding to join the sections of a hull and was the principal designer for the ships built for the US Shipping Board, the Isthmian Steamship Company and the Standard Oil Company. Craven died in 1941 at the age of 62.[176]

Albert R. McMullen was born in New Brunswick, Canada in 1882. He began working at Federal in 1919 as machinery superintendent. McMullen was in charge of the construction and installation of the propulsion mechanisms, including the first high-temperature, high-pressure steam turbine built in the US which was used in the passenger ship *Dixie* in 1927. Between 1942 and 46, McMullen was the general superintendent of Federals' Port Newark yard. McMullen died in 1947 at the age of 65.[177]

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173 "Shipyard Bid $3,557,000" NJ shipbuilding clipping file, Newark Public Library, November 1, 1963

174 "Want Action on Housing" NJ shipbuilding clipping file, Newark Public Library, January 23, 1941

175 "Pledges Homes for Workers" NJ shipbuilding clipping file, Newark Public Library, January 29, 1941

176 "John C. Craven, 62; Naval Architect," The New York Times October 21, 1941

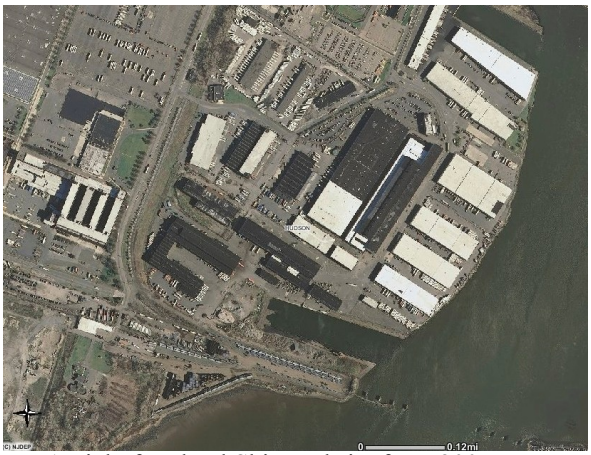
177 "A. McMullen Dies; A shipbuilder, 65," The New York Times November 26, 1947

Closing

After WWII, employment dropped from 52,000 at the peak war production to 4,100. Federal's satellite yard in Port Newark closed in 1946. Federal retained a private contract with National Gypsum to build two bulkers, which were delivered in May and June of 1947. No ships were delivered in 1948. *Epperson* was the last ship delivered from the Kearny yard.

Many of the WWII era ships which survived the war were later sold to foreign countries. A destroyer named *Borie* was sold to Argentina in 1972 and was struck in 1984. Some of the smaller landing ships were sold privately; others were scrapped in the 1960s and 70s. The last two private commissions with National Gypsum - *Gypsum Queen* and *Gypsum Prince* - were scrapped in 1987 and 1976, respectively. The *Lambs,* an EFC ship built in 1919, may have had the longest life of any ship built at Federal. It was not scrapped until 1974. The last Federal built ships to remain in service - *English* and *Haynsworth* - were destroyers built in 1944. They were sold to Taiwan in 1970 and were decommissioned in 1999.

In April 1948, US Steel sold the plant to the U. S. Navy for $2.3 million. The Navy, which had "no plans to operate the yard or lease it to a shipbuilder" during peacetime, simply "mothballed" the yard with the intent to retain control in case of an emergency.[178] The name was changed to the "Naval Industrial Reserve Shipyard, Kearny NJ" and was maintained as an annex to the New York Naval Shipyard in Brooklyn. The main office was retained by US Steel as a research laboratory. Ironically, in 1963, the site was sold to Lipsett Division of Luria Brothers Co. and Union Minerals & Alloys Corp. for use as a ship wrecking facility. Between 1960 and 1975 the docks, cranes and infrastructure were used to destroy some of the US Navy's most famous WWII era ships, including some that had been built by Federal.[179] Most of the site is currently owned by River Terminal Development and is used for warehousing and distribution.



Aerial of Federal Shipyard site from 2007

Conclusion

The Federal Shipbuilding and Drydock Company remained in business for nearly 32 years; 324 ships were built at the Kearny yard. Federal is credited with pioneering techniques of welding to join the steel sections of a ship's hull, which greatly reduced the time it took to build a ship by as much as a third and was adopted by other yards throughout the country. It also developed a high-

178 "Federal Shipyard Sale Revives Memories of Wartime Service" NJ shipbuilding clipping file, Newark Public Library, April 25, 1948

179 Federal Shipbuilding Incorporated Former Site. http://wikimapia.org/6046692/Federal-Shipbuilding-Incorporated-Former-Site

pressure, high-efficiency steam turbine which was adopted by the Navy in 1936. Federal emerged after WWI as a leader in the fabrication method of ship construction where parts were made in a separate shop on site and then assembled at the shipway. During WWII, an average of one destroyer was launched for the Navy every 13 days, which was a new world record. Federal received a Naval "E" award for continued excellent production.[180]

The Federal Shipbuilding and Drydock Company of Kearny has local significance as an important component of the history of Kearny and the Newark Bay area. Nationally, Federal significantly contributes to the history of shipbuilding in the first half of the 20th century, and its contribution to the history of WWI and WWII is of noteworthy importance.

180 "Federal Shipyard Sets New Record" NJ shipbuilding clipping file, Newark Public Library, February 23, 1943.

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IV. APPENDIX A: LIST OF SHIPS BUILT AT THE FEDERAL SHIPBUILDING & DRYDOCK COMPANY OF KEARNY

Hull #	Kearny or Newark	USSB or USMC Hull #	Original Name	Original Owner	Ship Type	GT (d=ldt)	Delivered	Disposition
1	K	955	Wichita	U.S. Shipping Board	Cargo Ship	6,119	Oct-18	Later Liberty (AK 35), torpedoed and lost 1942
2	K	956	Federal	U.S. Shipping Board	Cargo Ship	6,868	Nov-18	Later Federlock 1938, Fukuzan Maru 1941, bombed by aircraft and lost 1945
3	K	957	Piave	U.S. Shipping Board	Cargo Ship	6,869	Dec-18	Wrecked in the Goodwins 1919
4	K	958	Mercer	U.S. Shipping Board	Cargo Ship	6,219	Jan-19	Later Empire Kangaroo 1941, Parthenia 1946, Erminia Mazzella 1949, Pina Onorato 1951, scrapped 1958
5	K	959	Marne	U.S. Shipping Board	Cargo Ship	6,869	Feb-19	Later Marne Maru 1937, Yuzan Maru 1938, torpedoed and lost 1945
6	K	960	The Lambs	U.S. Shipping Board	Cargo Ship	6,629	Feb-19	Later Exporter 1927, Winona 1937, Akademik Pavlov 1945, scrapped 1974
7	K	961	Homestead	U.S. Shipping Board	Cargo Ship	6,629	Mar-19	Foundered 1927
8	K	962	Duquesne	U.S. Shipping Board	Cargo Ship	6,661	Mar-19	Later Empire Kudu 1940, wrecked 1941
9	K	963	McKeesport	U.S. Shipping Board	Cargo Ship	6,629	Apr-19	Torpedoed and lost 1943
10	K	964	Braddock	U.S. Shipping Board	Cargo Ship	6,629	Apr-19	Later Empire Redshank 1941, torpedoed and lost 1943
11	K	1422	Donora	U.S. Shipping Board	Cargo Ship	6,629	May-19	Later Orleans 1919, San Pedro 1929, scrapped 1936
12	K	1423	Lorain	U.S. Shipping Board	Cargo Ship	6,213	May-19	Later Empire Thrush 1942, torpedoed and lost 1942
13	K	1424	Waukegan	U.S. Shipping Board	Cargo Ship	6,629	May-19	Later John R. R. Hannay (AK 32) 1941, scrapped 1947
14	K	1425	Youngstown	U.S. Shipping Board	Cargo Ship	6,633	May-19	Scrapped 1938
15	K	1426	Ambridge	U.S. Shipping Board	Cargo Ship	6,631	Jun-19	Scrapped 1935
16	K	1427	Clairton	U.S. Shipping Board	Cargo Ship	6,631	Jul-19	Later Empire Reindeer 1941, torpedoed and lost 1942
17	K	1428	Innoko	U.S. Shipping Board	Cargo Ship	6,517	Aug-19	Scrapped 1935
18	K	1429	Wytheville	U.S. Shipping Board	Cargo Ship	6,517	Aug-19	Scrapped 1936
19	K	1430	Bellfort	U.S. Shipping Board	Cargo Ship	6,629	Aug-19	Scrapped 1938
20	K	1431	Westmoreland	U.S. Shipping Board	Cargo Ship	6,629	Aug-19	Scrapped 1938
21	K	1432	Bellbuckle	U.S. Shipping Board	Cargo Ship	6,207	Aug-19	Scrapped 1938
22	K	1433	Vincent	U.S. Shipping Board	Cargo Ship	6,210	Sep-19	Scuttled 1941
23	K	1434	Bellhaven	U.S. Shipping Board	Cargo Ship	6,098	Nov-19	Later Empire Peacock 1941, scuttled 1946
24	K	1435	Winona County	U.S. Shipping Board	Cargo Ship	6.049	Sep-19	Later Empire Whale 1941, torpedoed and lost 1943
25	K	1436	Bellepline	U.S. Shipping Board	Cargo Ship	6,517	Nov-19	Scrapped 1938
26	K	1437	Anaconda	U.S. Shipping Board	Cargo Ship	6,517	Oct-19	Later Annalock 1938, Rozan Maru 1941, bombed by aircraft and lost 1944
27	K	1438	Bellerose	U.S. Shipping Board	Cargo Ship	6,517	Dec-19	Scrapped 1933
28	K	1439	Kearny	U.S. Shipping Board	Cargo Ship	6,517	Dec-19	Scrapped 1932
29	K	1440	Bellflower	U.S. Shipping Board	Cargo Ship	6,517	Dec-19	Later Victoria 1940, torpedoed and lost 1940
30	K	1441	Bellemina	U.S. Shipping Board	Cargo Ship	6,517	Oct-19	Later Empire Magpie 1941, Jui Hsin 1948, Oriental Dragon 1950, Atlantic Unity 1955, scrapped 1959
31	K		Steel Age	U.S. Steel	Cargo Ship	6,187	Feb-20	Torpedoed and lost 1942
32	K		Steel Maker	U.S. Steel	Cargo Ship	6,187	Jan-20	Torpedoed and lost 1942
33	K		Steel Voyager	U.S. Steel	Cargo Ship	6,187	Feb-20	Torpedoed and lost 1943
34	K		Freeport Sulphur No	Freeport Sulphur Co.	Tanker	4,127	Apr-20	Later Empire Toucan 1940, torpedoed and lost 1940
35	K		Freeport Sulphur No	Freeport Sulphur Co.	Tanker	4,487	Oct-20	Later Thermo 1930, scrapped 1947
36	K		Steel Worker	U.S. Steel	Cargo Ship	5,686	Jul-20	Sunk by a mine 1942
37	K		Steel Mariner	U.S. Steel	Cargo Ship	5,686	Jul-20	Later Abraham Graetz 1952, scrapped 1960

38	K		Steel Trader	U.S. Steel	Cargo Ship	5,686	Jul-20	Later Kuzma Minin 1945, Steel Trader 1945, scrapped 1947
39	K		Steel Exporter	U.S. Steel	Cargo Ship	5,686	Aug-20	Later Fabritzius 1943, Steel Exporter 1945, scrapped 1947
40	K		Steel Engineer	U.S. Steel	Cargo Ship	5,686	Aug-20	Later Reina 1947, Tropaioforos 1955, scuttled in insurance fraud 1957
41	K		Steel Inventor	U.S. Steel	Cargo Ship	5,686	Nov-20	Later Sheila K 1954, scrapped 1954
42	K		Steel Ranger	U.S. Steel	Cargo Ship	5,686	Sep-20	Later Ann M 1954, scrapped 1954
43	K		Steel Seafarer	U.S. Steel	Cargo Ship	5,719	Nov-21	Bombed by aircraft and lost 1941
44	K		Steel Scientist	U.S. Steel	Cargo Ship	5,719	Dec-21	Torpedoed and lost 1942
45	K		Steel Navigator	U.S. Steel	Cargo Ship	5,719	Dec-21	Torpedoed and lost 1942
46	K		Vancolite	Imperial Oil	Tanker	10,831	Apr-21	Later E. J. Sadler 1926, torpedoed and lost 1942
47	K		Walter Jennings	Standard Oil of NJ	Tanker	10,396	Mar-21	Later Vandalia (IX 191) 1944, wrecked 1945
48	K		E. T. Bedford	Standard Oil of NJ	Tanker	10,396	Jun-21	Later Guardoqui (IX 218) 1945, E. T. Bedford 1946, scrapped 1947
49	K		Victolite	Imperial Oil	Tanker	10,825	Jul-21	Later E. M. Clark 1926, torpedoed and lost 1942
50	K		J. A. Moffet Jr.	Standard Oil of NJ	Tanker	10,396	Aug-20	Torpedoed and lost 1942
51	K		S. N. 105	Sinclair Oil	Tank Barge	545	Oct-20	
52	K		S. N. 104	Sinclair Oil	Tank Barge	545	Oct-20	
53	K		S. N. 103	Sinclair Oil	Tank Barge	545	Oct-20	
54	K		S. N. 106	Sinclair Oil	Tank Barge	545	Nov-20	
55	K		M. P. 20	Mexican Petroleum	Tank Barge	521	Dec-20	
56	K		M. P. 21	Mexican Petroleum	Tank Barge	521	Jan-21	
57	K		M. P. 22	Mexican Petroleum	Tank Barge	521	Jan-21	
58	K		M. P. 23	Mexican Petroleum	Tank Barge	521	Feb-21	
59	K		C B 7	U.S. Army	Hopper Barge	369	May-21	
60	K		C B 8	U.S. Army	Hopper Barge	369	May-21	
61	K		C B 9	U.S. Army	Hopper Barge	369	May-21	
62	K		C B 10	U.S. Army	Hopper Barge	369	May-21	
63	K		C B 11	U.S. Army	Hopper Barge	369	Jun-21	
64	K		C B 12	U.S. Army	Hopper Barge	369	Jun-21	
65	K		N.Y. Dock Railway 1	N.Y. Dock Railway Co.	Car Float	850	Jul-21	
66	K		N.Y. Dock Railway 1	N.Y. Dock Railway Co.	Car Float	850	Jul-21	
67	K		N.Y. Dock Railway 1	N.Y. Dock Railway Co.	Car Float	850	Aug-21	
68	K		Steel Traveler	U.S. Steel	Cargo Ship	7,056	Oct-22	Sunk by a mine 1944
69	K		Passaic	Gulf Refining	Tank Barge	552	May-22	
70	K		Raritan	Gulf Refining	Tank Barge	552	May-22	
71	K		ER-1	U.S. Army	Barge		May-23	
72	K		Allegheny	Merchants & Miners Trans.	Passenger/Cargo	5,486	Mar-23	Later American Seafarer 1942, scrapped 1949
73	K		Berkshire	Merchants & Miners Trans.	Passenger/Cargo	5,486	May-23	Later American Engineer 1942, scrapped 1948
74	K		Unnamed	Long Island RR	Car Float		Apr-23	
75	K		Unnamed	Long Island RR	Car Float		Nov-23	
76	K		Steel Motor	U.S. Steel	Cargo Ship	1,695	Jun-23	Later Tai Whu 1946, Nan Hu 1952, scrapped 1963
77	K		Steel Vendor	U.S. Steel	Cargo Ship	1,695	Jul-23	Foundered 1943
78	K		Seaboard 333	Seaboard Transportation	Tank Barge	552	Mar-24	Later O'Boyle 33 and B 33
79	K		M. P. 24	Mexican Petroleum	Tank Barge	521	May-24	
80	K		M. P. 25	Mexican Petroleum	Tank Barge	521	Jun-24	
81	K		El Oceano	Southern Pacific SS Line	Cargo Ship	6,767	Feb-25	Scrapped 1946
82	K		Panamco	Pan-American Petroleum	Tank Barge	398	May-25	
83	K		Steel Chemist	U.S. Steel	Cargo Ship	1,694	Aug-26	Later The Inland 1947, Transinland 1949, Inland Transport 1968, wrecked 1972 and laid up, scrapped 1981
84	K		Steel Electrician	U.S. Steel	Cargo Ship	1,694	Apr-26	Later Farrandoc 1948, Quebec Trader 1964, San Tome 1964, scrapped 1970
85	K		Willets Point	Corps of Engineers	Hopper Dredge	1,164	1926	Later Taylor

86	K		Gulfpride	Gulf Oil	Tanker	12,510	Apr-27	Later Hamilton Lake 1955, scrapped 1964
87	K		Diamond S No. 87	Wm. Spencer & Sons	Lighter	449	Jun-26	
88	K		Diamond S No. 89	Wm. Spencer & Sons	Lighter	449	Jun-26	
89	K		Dixie	Southern Pacific SS Line	Passenger/Cargo	8,188	Jan-28	Later Alcor 1941, Dixie 1946, scrapped 1950
90	K		L. V. 1215	Lehigh Valley RR	Car Float	891	1927	
91	K		L. V. 1217	Lehigh Valley RR	Car Float	891	1927	
92	K		L. V. 1219	Lehigh Valley RR	Car Float	891	1927	
93	K		D.L. & W. No. 36	Delaware RR	Car Float	762	1927	
94	K		D.L. & W. No. 37	Delaware RR	Car Float	762	1927	
95	K		D.L. & W. No. 38	Delaware RR	Car Float	762	1927	
96	K		Unnamed	Pennsylvania RR	Car Float		1927	
97	K		Unnamed	Pennsylvania RR	Car Float		1927	
98	K		Unnamed	Pennsylvania RR	Car Float		1927	
99	K		Unnamed	Pennsylvania RR	Car Float		1927	
100	K		Century	Hartol Products	Tank Barge	688	Dec-27	
101	K		Oil Transfer No. 15	Oil Transfer Corp.	Tank Barge	688	Feb-28	Later O'Boyle & Kenny No. 7, Val No. 7 and Blue Line No. 7
102	K		M. J. Derby	United Petroleum	Tanker	356	Jun-28	Later YO 50 1942, M.A. Krisel 1947, Reliable 1958, scrapped 1978
103	K		Oil Transfer No. 16	Oil Transfer Corp.	Tank Barge	481	Jul-28	Later Nepco
104	K		Oil Transfer No. 17	Oil Transfer Corp.	Tank Barge	481	Dec-28	
105	K		Oil Transfer No. 18	Oil Transfer Corp.	Tank Barge	523	Apr-29	
106	K		Victor	Lehigh Valley RR	Lighter	324	Feb-29	
107	K		Unnamed	Boston Molasses	Molasses Barge		Mar-29	
108	K		Unnamed	Boston Molasses	Molasses Barge		Mar-29	
109	K		Peru	W. H. Gahagan, Inc.	Dredge	727	Jul-29	
110	K		Essex No. 2	Henry Steers Inc.	Barge	376	1929	
111	K		Welding Light	O;Brien Bros.	Barge	375	Oct-29	
112	K		Unnamed	Venezuela Gulf Oil	Tank Barge		Oct-29	
113	K		G. Harrison Smith	Standard Shipping	Tanker	11,752	Oct-20	Later Esso Belfast 1950, scrapped 1958
114	K		W. S. Farish	Standard Shipping	Tanker	11,787	Nov-30	Later Esso Southampton 1950, scrapped 1958
115	K		Oil Transfer No. 20	Oil Transfer Corp.	Tank Barge	743	Mar-30	
116	K		Oil Transfer No. 21	Oil Transfer Corp.	Tank Barge	743	May-30	
117	K		T. J. Conway	Tanker Conway Inc.	Tank Barge	481	Jun-30	Later Perulite 1941, scrapped 1993
118	K		Unnamed	Central RR of NJ	Lighter		May-30	
119	K		Oil Transfer No. 22	Oil Transfer Corp.	Tank Barge	743	Apr-31	
120	K		Rockland No. 1	Rockland Oil	Tank Barge	737	Sep-33	
121	K		Santa Rosa	Grace Line	Passenger/Cargo	9,135	Oct-32	Later Santa Paula 1958, Athinai 1961, scrapped 1989
122	K		Santa Paula	Grace Line	Passenger/Cargo	9,135	Dec-32	Later Akropolis 1961, scrapped 1971
123	K		Santa Lucia	Grace Line	Passenger/Cargo	9,135	Jan-33	Later Leedstown (AP 73) 1942, torpedoed and lost 1942
124	K		Santa Elena	Grace Line	Passenger/Cargo	9,135	Mar-33	Bombed by aircraft and lost 1943
125	K		Hygrade No. 2	Hyfrade Oil	Tank Barge	822	Dec-33	
126	K		Seaboard No. 77	Seaboard Shipping	Tank Barge	821	Oct-33	
127	K		Flusser	U.S. Navy	Destroyer	1488d	1-Dec-36	Scrapped 1948
128	K		Reid	U.S. Navy	Destroyer	1488d	4-Jan-37	Kamikazied and lost 1944
129	K		Oil Transfer No. 24	Oil Transfer Corp.	Tank Barge	971	Mar-34	
130	K		Erie	Gulf Oil	Tank Barge	861	Apr-34	
131	K		Hygrade No. 10	Hygrade Oil	Tank Barge	961	Jun-34	
132	K		Oil Transfer No. 25	Oil Transfer Corp.	Tank Barge	1,022	Jun-34	
133	K		Oil Transfer No. 26	Oil Transfer Corp.	Tank Barge	1,022	Aug-34	
134	K		Somers	U.S. Navy	Destroyer	1850d	30-Jun-38	Scrapped 1947
135	K		Warrington	U.S. Navy	Destroyer	1850d	12-Aug-38	Sank during hurricane off Florida 1944
136	K		R. P. Resor	Standard Oil of NJ	Tanker	7,451	Feb-36	Torpedoed and lost 1942
137	K		T. C. McCobb	Standard Oil of NJ	Tanker	7,451	Apr-36	Torpedoed and lost 1942

138	K		Benham	U.S. Navy	Destroyer	1500d	18-Apr-39	Sunk by gunfire 1942
139	K		Ellet	U.S. Navy	Destroyer	1500d	18-Apr-39	Scrapped 1947
140	K		Lang	U.S. Navy	Destroyer	1500d	19-May-39	Scrapped 1946
141	K		Pan-Maine	Pan-American Petroleum	Tanker	7,237	Oct-36	Later Amoco Maine 1956, Cape Henry 1960, Sinchi Roca 1960, scrapped 1968
142	K		Pan-Florida	Pan-American Petroleum	Tanker	7,237	Dec-36	Later Caribbean Carrier 1955, Perama 1956, explosion, burnt and lost 1957
143	K		Esso Bayonne	Standard Oil of NJ	Tanker	7,698	Sep-37	Later New York Trader 1953, Lord Howard 1956, scrapped 1964
144	K		Esso Bayway	Standard Oil of NJ	Tanker	7,698	Nov-37	Later Maryland Trader 1953, Lord Calvert 1956, Nagos 1963, scrapped 19647
145	K		Esso Houston	Standard Oil of NJ	Tanker	7,698	Jan-38	Torpedoed and lost 1942
146	K		Esso Boston	Standard Oil of NJ	Tanker	7,698	Mar-38	Torpedoed and lost 1942
147	K		Anderson	U.S. Navy	Destroyer	1570d	26-May-39	Scrapped 1947
148	K		Hammann	U.S. Navy	Destroyer	1570d	11-Aug-39	Torpedoed and lost 1942
149	K		Pan-New York	Pan-American Petroleum	Tanker	7,701	Jun-38	Torpedoed and lost 1942
150	K		Pan-Maryland	Pan-American Petroleum	Tanker	7,701	Aug-38	Later Macuto 1954, Blue Dolphin 1961, scrapped 1971
151	K	5	Markay	U.S. Maritime Commission	Tanker	11,323	25-May-39	To USN 1940 as Suwanee (AO 33), converted to CVE 27 1942, scrapped 1962
152	K	6	Neosho	U.S. Maritime Commission	Tanker	11,323	7-Aug-39	To USN 1939 as Neosho (AO 23), bombed by aircraft and scuttled off New Guinea 1942
153	K	7	Esso Trenton	U.S. Maritime Commission	Tanker	11,323	Dec-39	To USN 1940 as Sangamon (AO 28), converted to CVE 26 1942, scrapped 1960
154	K	14	Challenge	U.S. Maritime Commission	Cargo Ship	7,194	Jul-39	To USN 1940 as Castor (AKS 1), scrapped 1969
155	K	15	Red Jacket	U.S. Maritime Commission	Cargo Ship	7,194	Sep-39	Scrapped 1974
156	K	16	Lightning	U.S. Maritime Commission	Cargo Ship	7,194	Sep-39	To USN 1941 as Mercury (AK 42, later AKS 20), scrapped 1975
157	K	17	Flying Cloud	U.S. Maritime Commission	Cargo Ship	7,194	Nov-39	To USN 141 as Jupiter (AK 43, later AVS 8), scrapped 1971
158	K	32	Flying Fish	U.S. Maritime Commission	Cargo Ship	7,194	Jan-40	Scrapped 1971
159	K	33	Comet	U.S. Maritime Commission	Cargo Ship	7,194	Mar-40	To USN 1941 as Pollux (AKS 2), wrecked and lost in Newfoundland 1942
160	K		Plunket	U.S. Navy	Destroyer	1620d	17-Jul-40	To Taiwan as Nan Yang 1959, struck 1975
161	K		Kearny	U.S. Navy	Destroyer	1620d	13-Sep-40	Scrapped 1972
162	K	38	Sea Fox	U.S. Maritime Commission	Cargo Ship	7,773	Mar-40	Later Mormacport 1940, Transyork 1961, Buckeye Atlantic 1969, scrapped 1972
163	K	39	Sea Hound	U.S. Maritime Commission	Cargo Ship	7,773	Apr-40	Later Frederick Lykes 1940, Harbor Hills 1965, Kings Point 1965, scrapped 1971
164	K	40	Sea Panther	U.S. Maritime Commission	Cargo Ship	7,773	May-40	Later Doctor Lykes 1940, Hamul (AD 20) 1941, scrapped 1976
165	K	41	Almeria Lykes	U.S. Maritime Commission	Cargo Ship	7,773	Jul-40	Later Empire Condor 1941, Almeria Lykes 1942, torpedoed and lost 1942
166	K	42	Howell Lykes	U.S. Maritime Commission	Cargo Ship	7,773	Sep-40	Later Empire Pintail 1941, Howell Lykes 1942, Flying Foam 1965, Grand Yaling 1971, scrapped 1971
167	K	43	Mormacyork	U.S. Maritime Commission	Cargo Ship	7,773	Feb-41	Later Anne Arundel (AP 76) 1942, Mormacyork 1946, scrapped 1970
168	K		Atlanta	U.S. Navy	Cruiser	6000d	24-Dec-41	Sunk by gunfire off Guadalcanal 1942
169	K		Juneau	U.S. Navy	Cruiser	6000d	14-Feb-42	Torpedoed and lost off Guadalcanal 1942
170	K		Edison	U.S. Navy	Destroyer	1735d	31-Jan-41	Scrapped 1966
171	K		Ericsson	U.S. Navy	Destroyer	1735d	13-Mar-41	Sunk as target 1970
172	K	67	Joseph Lykes	U.S. Maritime Commission	Cargo Ship	6,829	Nov-40	Scrapped 1972
173	K	68	Zoella Lykes	U.S. Maritime Commission	Cargo Ship	6,829	Nov-40	Scrapped 1973
174	K	69	Reuben Tipton	U.S. Maritime Commission	Cargo Ship	6,829	Dec-40	Torpedoed and lost 1942

175	K	70	Fred Morris	U.S. Maritime Commission	Cargo Ship	6,829	Dec-40	Later Otus (AS 20) 1940, Fred Morris 1946, scrapped 1970
176	K	71	John Lykes	U.S. Maritime Commission	Cargo Ship	6,829	Jan-41	Scrapped 1972
177	K		Esso Montpelier	Standard Oil of NJ	Tanker	7,698	Jul-40	Later Sabine 1952, scrapped 1961
178	K		Esso Concord	Standard Oil of NJ	Tanker	7,698	Jul-40	Later Naeco 1955, Southern States 1956, scrapped 1975
179	K	128	Santa Elisa	U.S. Maritime Commission	Cargo Ship	8,379	Jul-41	Torpedoed and lost 1942
180	K	129	Louise Lykes	U.S. Maritime Commission	Cargo Ship	6,155	Oct-41	Torpedoed and lost 1943
181	K	130	Jean Lykes	U.S. Maritime Commission	Cargo Ship	6,155	Dec-41	Later Libra (AK 53/AKA 12) 1941, scrapped 1985
182	K	131	Nancy Lykes	U.S. Maritime Commission	Cargo Ship	6,155	Apr-42	Later Pollux (AK 54/AKS 4) 1942, scrapped 1969
183	K	132	Harry Culbreath	U.S. Maritime Commission	Cargo Ship	6,155	May-42	Later Titania (AK 55/AKA 13) 1942, scrapped 1974
184	K	133	Delalba	U.S. Maritime Commission	Cargo Ship	6,155	Jun-42	Later Oberon (AK 56/AKA 14) 1942, scrapped 1971
185	K	134	Delsantos	U.S. Maritime Commission	Cargo Ship	6,155	Jul-42	Later Thurston (AP 77) 1942, Del Santos 1946, Chickasaw 1948, wrecked and abandoned 1962
186	K	135	Delaires	U.S. Maritime Commission	Cargo Ship	6,155	Sep-42	Later Del Aires 1946, Pacific Bear 1964, scrapped 1970
187	K		Hawaiian Merchant		Cargo Ship	7,775	Apr-41	Later Euryale (AS 22) 1943, scrapped 1972
188	K		Hawaiian Shipper		Cargo Ship	7,775	May-41	Later Empire Fulmar 1942, Hawaiian Shipper 1942, America Transport 1948, Washington 1958, Michigan 1960, Morning Light 1969, scrapped 1973
189	K		Pan-Rhode Island	Pan-American Petroleum	Tanker	7,742	Feb-41	Later Amoco Rhode Island 1954, scrapped 1962
190	K		Albert E. Watts	Sinclair Refining	Tanker	10,907	Jun-41	Scrapped 2003
191	K		Patrick J. Hurley	Sinclair Refining	Tanker	10,907	Nov-41	Torpedoed and lost 1942
192	K		E. W. Sinclair	Sinclair Refining	Tanker	10,907	Jan-42	Scrapped 1964
193	K		Jack Carnes	Sinclair Refining	Tanker	10,907	Feb-42	Torpedoed and lost 1942
194	K		Bristol	U.S. Navy	Destroyer	1630d	22-Oct-41	Torpedoed and lost 1943
195	K		Ellyson	U.S. Navy	Destroyer	1630d	28-Nov-41	DMS 19, to Japan as Asakaze 1954, scrapped 1969
196	K		Hambleton	U.S. Navy	Destroyer	1630d	22-Dec-41	DMS 20, scrapped 1972
197	K		Rodman	U.S. Navy	Destroyer	1630d	27-Jan-42	DMS 21, to Taiwan as Hsien Yang 1955, sunk 1976
198	K		Fletcher	U.S. Navy	Destroyer	2050d	30-Jun-42	Scrapped 1972
199	K		Radford	U.S. Navy	Destroyer	2050d	22-Jul-42	Scrapped 1970
200	K		Jenkins	U.S. Navy	Destroyer	2050d	31-Jul-42	Scrapped 1971
201	K		La Vallette	U.S. Navy	Destroyer	2050d	12-Aug-42	Scrapped 1974
202	K		Saufley	U.S. Navy	Destroyer	2050d	29-Aug-42	Sunk as target 1968
203	K		Waller	U.S. Navy	Destroyer	2050d	1-Oct-42	Sunk as target 1970
206	K		Aaron Ward	U.S. Navy	Destroyer	1630d	4-Mar-42	Sunk by air attack off Guadalcanal 1943
207	K		Buchanan	U.S. Navy	Destroyer	1630d	21-Mar-42	To Turkey as Gelibolu (D 346) 1949, struck 1976
208	K		Duncan	U.S. Navy	Destroyer	1630d	16-Apr-42	Sunk by gunfire off Savo Island 1942
209	K		Lansdowne	U.S. Navy	Destroyer	1630d	29-Apr-42	To Turkey as Gaziantep (D 344) 1949, struck 1973
210	K		Lardner	U.S. Navy	Destroyer	1630d	13-May-42	To Turkey as Gemlik (D 347) 1949, struck 1981
211	K		McCalla	U.S. Navy	Destroyer	1630d	27-May-42	To Turkey as Giresun (D 345) 1949, struck 1973
212	K		Mervine	U.S. Navy	Destroyer	1630d	17-Jun-42	DMS 31, scrapped 1969
213	K		Quick	U.S. Navy	Destroyer	1630d	3-Jul-42	DMS 32, scrapped 1973
214	K		Philip	U.S. Navy	Destroyer	2050d	21-Nov-42	Scrapped 1971
215	K		Renshaw	U.S. Navy	Destroyer	2050d	5-Dec-42	Scrapped 1970
216	K		Ringgold	U.S. Navy	Destroyer	2050d	24-Dec-42	To Germany as Zerstorer 2 (D 171) 1959, to Greece as Kimon (D 42) 1981, scrapped 1993
217	K		Schroeder	U.S. Navy	Destroyer	2050d	1-Jan-43	Scrapped 1974

218	K		Sigsbee	U.S. Navy	Destroyer	2050d	23-Jan-43	Scrapped 1975
222	K		Davidson	U.S. Navy	Destroyer	1630d	11-Sep-42	DMS 37, scrapped 1973
223	K		Edwards	U.S. Navy	Destroyer	1630d	18-Sep-42	Scrapped 1973
224	K		Glennon	U.S. Navy	Destroyer	1630d	8-Oct-42	Sunk by a mine off Normandy 1944
225	K		Jeffers	U.S. Navy	Destroyer	1630d	5-Nov-42	DMS 27, scrapped 1973
226	K		Maddox	U.S. Navy	Destroyer	1630d	31-Oct-42	Bombed by aircraft and lost off Sicily 1943
227	K		Nelson	U.S. Navy	Destroyer	1630d	26-Nov-42	Scrapped 1969
228	K	180	Santa Rita	U.S. Maritime Commission	Cargo Ship	8,379	Sep-42	Torpedoed and lost 1942
229	K		Stevenson	U.S. Navy	Destroyer	1630d	15-Dec-42	Scrapped 1970
230	K		Stockton	U.S. Navy	Destroyer	1630d	11-Jan-43	Scrapped 1973
231	K		Thorn	U.S. Navy	Destroyer	1630d	1-Apr-43	Sunk as target 1974
232	K		Turner	U.S. Navy	Destroyer	1630d	15-Apr-43	Exploded and sank off New York 1944
233	K	189	Santa Cecilia	U.S. Maritime Commission	Cargo Ship	6,507	Aug-42	Later Silver Star 1946, Santa Juana 1947, scrapped 1970
234	K	190	Santa Margarita	U.S. Maritime Commission	Cargo Ship	6,507	Sep-42	Later Alboni 1946, Santa Adela 1947, scrapped 1970
235	K	191	Santa Maria	U.S. Maritime Commission	Cargo Ship	6,507	Oct-42	Later Cherubim 1946, Claiborne 1948, scrapped 1971
236	K	192	African Star	U.S. Maritime Commission	Cargo Ship	6,507	Oct-42	Torpedoed and lost 1942
237	K	193	African Dawn	U.S. Maritime Commission	Cargo Ship	6,507	Nov-42	Later African Lake 1965, scrapped 1973
238	K	194	African Sun	U.S. Maritime Commission	Cargo Ship	6,507	Dec-42	Later African Lagoon 1965, scrapped 1970
239	K	195	Santa Barbara	U.S. Maritime Commission	Cargo Ship	6,507	Jan-43	Later Norseman 1946, Santa Flavia 1947, scrapped 1971
240	K	196	Santa Catalina	U.S. Maritime Commission	Cargo Ship	6,507	Feb-43	Torpedoed and lost 1943
241	K	199	Andromeda	U.S. Maritime Commission	Cargo Ship	8,425	Apr-43	To USN 1943 as AK 64, later AKA 15, scrapped 1971
242	K	200	Appalachian	U.S. Maritime Commission	Cargo Ship	8,425	Feb-43	To USN 1943 as AGC 1, scrapped 1960
243	K	201	Blue Ridge	U.S. Maritime Commission	Cargo Ship	8,425	Mar-43	To USN 1943 as AGC 2, scrapped 1962
244	K	202	Rocky Mount	U.S. Maritime Commission	Cargo Ship	8,425	Mar-43	To USN 1943 as AGC 3, scrapped 1973
245	K	203	Thuban	U.S. Maritime Commission	Cargo Ship	8,512	Jun-43	To USN 1943 as AK 68, later AKA 19, scrapped 1969
246	K	204	Virgo	U.S. Maritime Commission	Cargo Ship	8,512	Jul-43	To USN 1943 as AK 69, later AKA 20, AE 30, scrapped 1973
247	K	205	Aquarius	U.S. Maritime Commission	Cargo Ship	8,453	Aug-43	To USN 1943 as AK 66, later AKA 16, Pioneer Lake 1947, American Trapper 1956, scrapped 1967
248	K	206	Centaurus	U.S. Maritime Commission	Cargo Ship	8,461	Oct-43	To USN 1943 as AK 66, later AKA 17, Pioneer Bay 1947, American Gunner 1956, scrapped 1971
249	K	207	Cepheus	U.S. Maritime Commission	Cargo Ship	8,432	Dec-43	To USN 1943 as AK 67, later AKA 18, Pioneer Sea 1947, American Hunter 1956, Brookville 1966, wrecked and abandoned 1968
250	K	208	Achernar	U.S. Maritime Commission	Cargo Ship	8,398	Jan-44	To USN 1944 as AKA 53, to Spain 1965 as Castilla (TA 21)
251	K	209	Alshain	U.S. Maritime Commission	Cargo Ship	8,410	Mar-44	To USN 1944 as AKA 55, scrapped 1978
252	K	210	Chara	U.S. Maritime Commission	Cargo Ship	8,398	Jun-44	To USN 1944 as AKA 58, later AE 31, scrapped 1972
253	K	211	Diphda	U.S. Maritime Commission	Cargo Ship	8,420	Jul-44	To USN 1944 as AKA 59, scrapped 1976
254	K	212	Leo	U.S. Maritime Commission	Cargo Ship	8,421	Aug-44	To USN 1944 as AKA 60, scrapped 1976
255	K	213	Muliphen	U.S. Maritime Commission	Cargo Ship	8,430	Oct-44	To USN 1944 as AKA 61, scrapped 1970
256	K	214	Sheliak	U.S. Maritime Commission	Cargo Ship	8,380	Dec-44	To USN 1944 as AKA 62, later Pioneer Isle 1948, Australian Isle 1965, Transluna 1969, scrapped 1969
257	K	215	Theenim	U.S. Maritime Commission	Cargo Ship	8,373	Dec-44	To USN 1944 as AKA 63, later American Inventor 1948, Pioneer Surf 1959, Australian Surf 1965, Surfer 1969, scrapped 1970

258	K	216	Winston	U.S. Maritime Commission	Cargo Ship	8,431	Jan-45	To USN 1944 as AKA 94, scrapped 1980
259	K	217	Marquette	U.S. Maritime Commission	Cargo Ship	8,431	Jun-45	To USN 1945 as AKA 95, scrapped 1972
260	K	218	Mathews	U.S. Maritime Commission	Cargo Ship	8,431	Mar-45	To USN 1945 as AKA 96, scrapped 1969
261	K	219	Merrick	U.S. Maritime Commission	Cargo Ship	8,431	Mar-45	To USN 1945 as AKA 97, scrapped 1980
262	K	220	Montague	U.S. Maritime Commission	Cargo Ship	8,431	Apr-45	To USN 1945 as AKA 98, scrapped 1971
263	K	221	Rolette	U.S. Maritime Commission	Cargo Ship	8,431	Apr-45	To USN 1945 as AKA 99, scrapped 1978
264	K	222	Oglethorpe	U.S. Maritime Commission	Cargo Ship	8,431	Jun-45	To USN 1945 as AKA 100, scrapped 1969
265	K		Dashiell	U.S. Navy	Destroyer	2050d	20-Mar-43	Scrapped 1975
266	K		Bullard	U.S. Navy	Destroyer	2050d	9-Apr-43	Scrapped 1973
267	K		Kidd	U.S. Navy	Destroyer	2050d	23-Apr-43	Memorial in Baton Rouge LA 1974
268	K	668	GEN John Pope	U.S. Maritime Commission	Troop Ship	17,832	Aug-45	To USN 1945 as AP 110, NDRF 1969
269	K	669	GEN A. E. Anderson	U.S. Maritime Commission	Troop Ship	17,832	Oct-45	To USN 1945 as AP 111, NDRF 1958
270	K	670	GEN W. A. Mann	U.S. Maritime Commission	Troop Ship	17,832	Oct-45	To USN 1945 as AP 112, NDRF 1966
271	K	671	GEN H. W. Butner	U.S. Maritime Commission	Troop Ship	17,806	Jan-45	To USN 1945 as AP 113, NDRF 1960
272	K	672	GEN William. Mitch	U.S. Maritime Commission	Troop Ship	17,811	Jan-45	To USN 1945 as AP 114, NDRF 1966
273	K	673	GEN George M. Ran	U.S. Maritime Commission	Troop Ship	17,811	Apr-45	To USN 1945 as AP 115, scrapped 1975
274	K	674	GEN M. C. Meigs	U.S. Maritime Commission	Troop Ship	17,811	Jun-45	To USN 1945 as AP 116, NDRF 1958, wrecked and abandoned 1972
275	K	675	GEN W. H. Gordon	U.S. Maritime Commission	Troop Ship	17,811	Jun-45	To USN 1945 as AP 117, NDRF 1968
276	K	676	GEN W. P. Richards	U.S. Maritime Commission	Troop Ship	17,811	Nov-45	To USN 1945 as AP 118, sold private 1949, now cruise ship Emerald Seas
277	K	677	GEN William Weigel	U.S. Maritime Commission	Troop Ship	17,811	Jan-45	To USN 1945 as AP 119, NDRF 1968
278	N		Levy	U.S. Navy	Destroyer Escort		5/13/43	Scrapped 1974
279	N		McConnell	U.S. Navy	Destroyer Escort		5/28/43	Scrapped 1974
280	N		Osterhaus	U.S. Navy	Destroyer Escort		6/12/43	Scrapped 1974
281	N		Parks	U.S. Navy	Destroyer Escort		6/23/43	Scrapped 1973
282	N		Baron	U.S. Navy	Destroyer Escort		7/5/43	To Uruguay as Uruguay (F 1) 1952, struck 1990
283	N		Acree	U.S. Navy	Destroyer Escort		7/19/43	Scrapped 1973
284	N		Amick	U.S. Navy	Destroyer Escort		7/26/43	To Japan as Asahi (DE 262) 1955, to the Philippines as Datu Siratuna (PF 77) 1976, struck 1984
285	N		Atherton	U.S. Navy	Destroyer Escort		8/29/43	To Japan as Hatsuhi (DE 263) 1955, to the Philippines as Rajah Humabon (PF 78) 1976, struck 1995
286	N		Booth	U.S. Navy	Destroyer Escort		9/19/43	To the Philippines as Datu Kalantiaw (PF 76) 1976, sunk 1981
287	N		Carroll	U.S. Navy	Destroyer Escort		10/24/43	Scrapped 1966
288	N		Cooner	U.S. Navy	Destroyer Escort		8/21/43	Scrapped 1973
289	N		Eldridge	U.S. Navy	Destroyer Escort		8/27/43	To Greece as Leon (D 54) 1951, struck 1991
290	N		Marts	U.S. Navy	Destroyer Escort		9/3/43	To Brazil as Bocaina 1945, struck 1975
291	N		Pennewill	U.S. Navy	Destroyer Escort		9/15/43	To Brazil as Bertioga 1944, struck 1975
292	N		Micka	U.S. Navy	Destroyer Escort		9/23/43	Scrapped 1967
293	N		Reybold	U.S. Navy	Destroyer Escort		9/29/43	To Brazil as Bracui 1944, struck 1974
294	N		Herzog	U.S. Navy	Destroyer Escort		10/6/43	To Brazil as Beberibe 1944, struck 1968
295	N		McAnn	U.S. Navy	Destroyer Escort		10/11/43	To Brazil as Bauru 1944, museum
296	N		Trumpeter	U.S. Navy	Destroyer Escort		10/16/43	Scrapped 1974
297	N		Straub	U.S. Navy	Destroyer Escort		10/25/43	Scrapped 1974
298	N		Gustafson	U.S. Navy	Destroyer Escort		11/1/43	To the Netherlands as Van Ewijck (F 808) 1950, scrapped 1967
299	N		S. S. Miles	U.S. Navy	Destroyer Escort		11/4/43	To France as Arabe (F 717) 1950, struck 1958
300	N		Wesson	U.S. Navy	Destroyer Escort		11/11/43	To Italy as Andromeda (F 592) 1951, struck 1970

301	N		Riddle	U.S. Navy	Destroyer Escort	11/17/43	To France as Kabyle (F 718) 1950, struck 1958
302	N		Swearer	U.S. Navy	Destroyer Escort	11/24/43	To France as Bambara (F 719) 1950, struck 1958
303	N		Stern	U.S. Navy	Destroyer Escort	12/1/43	To the Netherlands as Van Zijll (F 811) 1950, scrapped 1967
304	N		O'Neil	U.S. Navy	Destroyer Escort	12/6/43	To the Netherlands as Dubois (F 809) 1950, scrapped 1967
305	N		Bronstein	U.S. Navy	Destroyer Escort	12/13/43	To Uruguay as Artigas (F 2) 1952, struck 1988
306	N		Baker	U.S. Navy	Destroyer Escort	12/23/43	To France as Malgache (F 724) 1952, struck 1969
307	N		Coffman	U.S. Navy	Destroyer Escort	12/27/43	Scrapped 1973
308	N		Eisner	U.S. Navy	Destroyer Escort	1/16/44	To the Netherlands as De Zeeuw (F 810) 1950, scrapped 1967
309	N		Garfield Thomas	U.S. Navy	Destroyer Escort	1/24/44	To Greece as Panthir (D 67) 1951, struck 1992
310	N		Wingfield	U.S. Navy	Destroyer Escort	1/28/44	To France as Sakalave (F 720) 1950, struck 1958
311	N		Thornhill	U.S. Navy	Destroyer Escort	2/1/44	To Italy as Aldebaran (F 592) 1951, struck 1976
312	N		Rinehart	U.S. Navy	Destroyer Escort	2/12/44	To the Netherlands as De Bitter (F 807) 1950, scrapped 1967
313	N		Roche	U.S. Navy	Destroyer Escort	2/21/44	Scuttled 1946
314-349	N		36 boats	U.S. Navy	Landing Craft		For details, see the LCI(L) page
362	K		Black	U.S. Navy	Destroyer 2050d	21-May-43	Scrapped 1971
363	K		Chauncey	U.S. Navy	Destroyer 2050d	31-May-43	Scrapped 1974
364	K		Clarence K. Bronson	U.S. Navy	Destroyer 2050d	11-Jun-43	To Turkey as Istanbul (D 340) 1967, struck 1987
365	K		Cotten	U.S. Navy	Destroyer 2050d	24-Jul-43	Scrapped 1975
366	K		Dortch	U.S. Navy	Destroyer 2050d	7-Aug-43	To Argentina as Espora (D 21) 1961, struck 1977
367	K		Gatling	U.S. Navy	Destroyer 2050d	19-Aug-43	Scrapped 1977
368	K		Healy	U.S. Navy	Destroyer 2050d	3-Sep-43	Scrapped 1976
369	K		Hickox	U.S. Navy	Destroyer 2050d	10-Sep-43	To Korea as Pusan (D 913) 1968, struck 1989
370	K		Hunt	U.S. Navy	Destroyer 2050d	22-Sep-43	Scrapped 1975
371	K		Lewis Hancock	U.S. Navy	Destroyer 2050d	29-Sep-43	To Brazil as Piaui (D 31) 1967, struck 1989
372	K		Marshall	U.S. Navy	Destroyer 2050d	16-Oct-43	Scrapped 1970
373	K		McDermut	U.S. Navy	Destroyer 2050d	19-Nov-43	Scrapped 1966
374	K		McGowan	U.S. Navy	Destroyer 2050d	20-Dec-43	To Spain as Jorge Juan (D 25) 1960, struck 1988
375	K		McNair	U.S. Navy	Destroyer 2050d	30-Dec-43	Scrapped 1976
376	K		Melvin	U.S. Navy	Destroyer 2050d	24-Nov-43	Scrapped 1975
377	K		Allen M. Sumner	U.S. Navy	Destroyer 2200d	26-Jan-44	Scrapped 1974
378	K		Moale	U.S. Navy	Destroyer 2200d	28-Feb-44	Scrapped 1974
379	K		Ingraham	U.S. Navy	Destroyer 2200d	10-Mar-44	To Greece as Miaoulis (D 211) 1971, struck 1992
380	K		Cooper	U.S. Navy	Destroyer 2200d	27-Mar-44	Exploded and lost in Leyte Gulf 1944
381	K		English	U.S. Navy	Destroyer 2200d	4-May-44	To Taiwan as Huei Yang (D 972) 1970, struck 1999
382	K		Charles S. Sperry	U.S. Navy	Destroyer 2200d	17-May-44	To Chile as Ministro Zenteno (D 16) 1973, struck 1990
383	K		Ault	U.S. Navy	Destroyer 2200d	31-May-44	Scrapped 1974
384	K		Waldron	U.S. Navy	Destroyer 2200d	8-Jun-44	To Colombia as Santander 9D 030 1973, struck 1986
385	K		Haynsworth	U.S. Navy	Destroyer 2200d	22-Jun-44	To Taiwan as Yuen Yang (D 944) 1970, struck 1999
386	K		John W. Weeks	U.S. Navy	Destroyer 2200d	21-Jul-44	Sunk as target 1970
387	K		Hank	U.S. Navy	Destroyer 2200d	28-Aug-44	To Argentina as Segui (D 25) 1972, struck 1983
388	K		Wallace L. Lind	U.S. Navy	Destroyer 2200d	8-Sep-44	To Korea as Daegu (D 917) 1973, struck 1996

389	K		Borie	U.S. Navy	Destroyer	2200d	21-Aug-44	To Argentina as Hipolito Bouchard (D 26) 1972, struck 1984
390	K		Compton	U.S. Navy	Destroyer	2200d	4-Nov-44	To Brazil as Matto Grosso (D 34) 1972, struck 1990
391	K		Gainard	U.S. Navy	Destroyer	2200d	23-Nov-44	Scrapped 1974
392	K		Soley	U.S. Navy	Destroyer	2200d	4-Dec-44	Sunk as target 1970
393	K		Harlan R. Dickson	U.S. Navy	Destroyer	2200d	17-Feb-45	Scrapped 1973
394	K		Hugh Purvis	U.S. Navy	Destroyer	2200d	1-Mar-45	To Turkey as Zafer (D 356) 1972, scrapped 1994
395	N		Gearing	U.S. Navy	Destroyer		5/3/45	Scrapped 1974
396	N		Eugene A. Greene	U.S. Navy	Destroyer		6/8/45	To Spain as Churruca (D 61) 1972, struck 1989
397	N		Gyatt	U.S. Navy	Destroyer		7/2/45	Redesignated DDG 1, sunk as target 1972
398	N		Kenneth D. Bailey	U.S. Navy	Destroyer		7/31/45	To Iran for parts 1975
399	N		William R. Rush	U.S. Navy	Destroyer		9/21/45	To Korea as Kang Won 1978, to the Philippines for spares 1995
400	N		William M. Wood	U.S. Navy	Destroyer		11/24/45	Sunk as target 1983
401	N		Wiltsie	U.S. Navy	Destroyer		1/17/46	To Pakistan as Tariq (D 165) 1977, struck 1990
402	N		Theodore E. Chandle	U.S. Navy	Destroyer		3/22/46	Scrapped 1975
403	N		Hamner	U.S. Navy	Destroyer		7/17/46	To Taiwan as Chao Yang 1980
404	N		Epperson	U.S. Navy	Destroyer		3/19/49	To Pakistan as Taimur (D 166) 1977, struck 1990
407	N		Corbesier	U.S. Navy	Destroyer Escort		3/31/44	Scrapped 1973
408	N		Conklin	U.S. Navy	Destroyer Escort		4/21/44	Scrapped 1972
409	N		McCoy Reynolds	U.S. Navy	Destroyer Escort		5/2/44	To Portugal as Corte Real (F 334) 1957, struck 1968
410	N		William Seiverling	U.S. Navy	Destroyer Escort		6/1/44	Scrapped 1973
411	N		Ulvert M. Moore	U.S. Navy	Destroyer Escort		7/18/44	Sunk as target 1966
412	N		Kendall C. Campbell	U.S. Navy	Destroyer Escort		7/31/44	Scrapped 1973
413	N		Goss	U.S. Navy	Destroyer Escort		8/26/44	Scrapped 1972
414	N		Grady	U.S. Navy	Destroyer Escort		9/11/44	Scrapped 1969
415	N		Charles E. Brannon	U.S. Navy	Destroyer Escort		11/1/44	Scrapped 1969
416	N		Albert T. Harris	U.S. Navy	Destroyer Escort		11/29/44	Scrapped 1969
417	N		Cross	U.S. Navy	Destroyer Escort		1/8/45	Scrapped 1968
418	N		Hanna	U.S. Navy	Destroyer Escort		1/27/45	Scrapped 1973
419	N		Joseph E. Connolly	U.S. Navy	Destroyer Escort		2/28/45	Sunk as target 1972
477	N		Gilligan	U.S. Navy	Destroyer Escort		5/12/44	Scrapped 1972
478	N		Formoe	U.S. Navy	Destroyer Escort		10/5/44	To Portugal as Diego Cao (F 333) 1957, struck 1968
479	N		Heyliger	U.S. Navy	Destroyer Escort		3/24/45	Sunk as target 1969
505	K	2080	GEN J. C. Breckinrid	U.S. Maritime Commission	Troop Ship	17,811	Jun-45	To USN as AP 176, scrapped
509	K	2084	Tillie Lykes	U.S. Maritime Commission	Cargo Ship	7,996	Aug-45	Scrapped 1972
510	K	2085	Almeria Lykes	U.S. Maritime Commission	Cargo Ship	7,996	Sep-45	Scrapped 1971
511	K	2086	Lipscomb Lykes	U.S. Maritime Commission	Cargo Ship	7,858	Oct-45	Scrapped 1973
512	K	2087	Norman Lykes	U.S. Maritime Commission	Cargo Ship	7,854	Nov-45	Scrapped 1972
513	K	2088	Doctor Lykes	U.S. Maritime Commission	Cargo Ship	7,854	Dec-45	Scrapped 1973
514	K	2089	African Star	U.S. Maritime Commission	Cargo Ship	7,971	Apr-46	Scrapped 1973
515	K	2090	African Planet	U.S. Maritime Commission	Cargo Ship	7,971	Jun-46	Scrapped 1974
516	K	2091	African Rainbow	U.S. Maritime Commission	Cargo Ship	7,971	Jul-46	Scrapped 1973
517	K	2092	African Crescent	U.S. Maritime Commission	Cargo Ship	7,972	Oct-46	Scrapped 1973
518	K	2093	African Moon	U.S. Maritime Commission	Cargo Ship	7,858	Feb-47	Scrapped 1973
519	K	2094	African Lightning	U.S. Maritime Commission	Cargo Ship	7,858	Feb-47	Scrapped 1973
520	K		Juneau	U.S. Navy	Cruiser	6000d	14-Feb-46	Scrapped 1960
521	K		Spokane	U.S. Navy	Cruiser	6000d	17-May-46	Scrapped 1973
522	K		Fresno	U.S. Navy	Cruiser	6000d	27-Nov-46	Scrapped 1966
523	N			U.S. Navy	Landing Ship	520	9-May-44	Sold to Foss 1947
524	N			U.S. Navy	Landing Ship	520	17-May-44	Sold to Harbour Towing 1948
525	N			U.S. Navy	Landing Ship	520	22-May-44	Sold to R. J. McCallum 1948

526	N			U.S. Navy	Landing Ship	520	27-May-44	To China 1946, escaped to Taiwan 1949 as LSM-341, in collision and sank 1969
527	N			U.S. Navy	Landing Ship	520	30-May-44	Sold to National Metal 1946 for scrapping
528	N			U.S. Navy	Landing Ship	520	2-Jun-44	Sold to Alexander SY 1946
529	N			U.S. Navy	Landing Ship	520	16-Jun-44	Sold 1946, converted to barge
530	N			U.S. Navy	Landing Ship	520	21-Jun-44	Sold to Patton-Tully Tptn. 1946
531	N			U.S. Navy	Landing Ship	520	28-Jun-44	Sold to Clark Sales 1948
532	N			U.S. Navy	Landing Ship	520	30-Jun-44	Laid up 1946, sold to Hyman-Michaels 1960
533	N			U.S. Navy	Landing Ship	520	3-Jul-44	Sold to Standard Dredging 1947
534	N			U.S. Navy	Landing Ship	520	10-Jul-44	Sold to American Barge 1947
535	N			U.S. Navy	Landing Ship	520	18-Jul-44	Wrecked at Okinawa 13-Oct-45, scuttled
536	N			U.S. Navy	Landing Ship	520	29-Jul-44	Sold to Hughes Bros. 1947
537	N			U.S. Navy	Landing Ship	520	1-Aug-44	To Argentina 1948 as BDI No. 1, scrapped 1972
538	N			U.S. Navy	Landing Ship	520	10-Aug-44	Laid up 1946, to Korea 1955 as LSM-652, Teo Do 1968, scrapped 1982
539	N			U.S. Navy	Landing Ship	520	18-Aug-44	Laid up 1946, sold to Zidell 1960, converted to barge, resold to Brix 1989
540	N			U.S. Navy	Landing Ship	520	28-Aug-44	Laid up 1946, sold to Zidell 1960, converted to barge
541	N			U.S. Navy	Landing Ship	520	2-Sep-44	Scuttled off Guam 1947
542	N			U.S. Navy	Landing Ship	520	11-Sep-44	Sold to Arthur C. Penberthy 1948 for scrapping
543	N			U.S. Navy	Landing Ship	520	19-Sep-44	Sold to Crowley 1948, converted to barge
544	N			U.S. Navy	Landing Ship	520	28-Sep-44	Laid up 1946, sold to Shaver Tptn. 1960, converted to barge
545	N			U.S. Navy	Landing Ship	520	6-Oct-44	Laid up 1946, converted to cable repair ship Portunus (ARC 1) 1952, to Portugal 1959 as Medusa (A 5214), disposed of 1976
546	N			U.S. Navy	Landing Ship	520	16-Oct-44	To Vietnam 1963 as Hau Giang (HQ-406), scuttled 1975, raised by North Vietnam 1977, discarded 1990
547	N			U.S. Navy	Landing Ship	520	19-Oct-44	Sold to Arthur C. Penberthy 1948 for scrapping
548	N			U.S. Navy	Landing Ship	520	25-Oct-44	To China 1948
549	N			U.S. Navy	Landing Ship	520	31-Oct-44	Sold to O. W. Dyer 1948
550	N			U.S. Navy	Landing Ship	520	6-Nov-44	To China 1948
551	N			U.S. Navy	Landing Ship	520	13-Nov-44	Scuttled off Guam 1947
552	N			U.S. Navy	Landing Ship	520	18-Nov-44	To China 1946, seized by PRC 1949
553	N			U.S. Navy	Landing Ship	520	27-Nov-44	Sold to C. T. Smith 1948, converted to barge, to Tidewater BL as Barge No. 76
554	N			U.S. Navy	Landing Ship	520	5-Dec-44	To China 1948
555	N			U.S. Navy	Landing Ship	520	14-Dec-44	To China 1946 as Mei Yi, escaped to Taiwan 1949, scrapped 1972
556	N			U.S. Navy	Landing Ship	520	20-Dec-44	Sold to Russell B. Steams 1947
557	N			U.S. Navy	Landing Ship	520	20-Dec-44	Sold to GM Diesel 1947
558	N			U.S. Navy	Landing Ship	520	8-Jan-45	Laid up 1946, sold to Zidell 1960, converted to barge
559	N			U.S. Navy	Landing Ship	520	13-Jan-45	Laid up 1946, sold to Warm Construction 1960
560	N			U.S. Navy	Landing Ship	520	22-Jan-45	To China 1948
561	N			U.S. Navy	Landing Ship	520	31-Jan-45	Laid up 1946, sold to Hatch & Kirk 1958
562	N			U.S. Navy	Landing Ship	520	7-Feb-45	To China 1948
563	N			U.S. Navy	Landing Ship	520	16-Feb-45	To China 1948
564	N			U.S. Navy	Landing Ship	520	26-Feb-45	Sold to Wood Towing 1947
565	K	2896	Santa Monica	U.S. Maritime Commission	Cargo Ship	8,610	Nov-46	Later Maximus 1963, A. & J. Trader 1964, Santa Monica 1964, Cosmos Trader 1966, scrapped 1969

566	K	2897	Santa Clara	U.S. Maritime Commission	Cargo Ship	8,610	Dec-46	Scrapped 1970
567	K	2898	Santa Sofia	U.S. Maritime Commission	Cargo Ship	8,610	Jan-47	Later A. & J. Faith 1963, Santa Sofia 1964, Cosmos Mariner 1966, scrapped 1970
568	K		Gypsum Queen	National Gypsum	Bulker	4,819	May-47	Later Bulk Queen 1978, scrapped 1987
569	K		Gypsum Prince	National Gypsum	Bulker	4,819	Jun-47	Later El Sipra 1976, scrapped 1976

V. APPENDIX B: EMPLOYMENT OF AFRICAN-AMERICANS AT THE FEDERAL SHIPBUILDING & DRYDOCK COMPANY OF KEARNY

Before World War II, virtually all employees at the former Federal Shipbuilding & Drydock Company of Kearny (1917-1949) were white local residents as evidenced by company records, newspaper articles, period periodicals, and photographs; most lived in nearby Hudson and Essex county municipalities, including Newark, Kearny, and Jersey City. No known company manifests or archival written documentation are known to exist that exactly identifies or highlights the population of African-American employees at the former Federal Shipbuilding & Drydock Company of Kearny. However, close examination of archival company magazines (1918-1920) held at the National Archives in College Park, Maryland,[181] visually reveals African-American employees *on site* from the company's earliest operations. These photographic magazine spreads (Figures 1-3) consist of group employee shots taken for *The Federal Shipbuilder* magazine, a professionally produced company publication that reported on and/or featured institutional histories, ship launchings, technological advances, social goings-on, etc.

On the eve of the Second World War, it was obvious that the African-American workforce at the Federal yards was more substantial; photographic evidence in the digital collections of the Library of Congress attest to this conclusion (Figures 4-9). This growth in racial employment equality can be attributed to the pioneering advocacy efforts of A. Philip Randolph, president of the Brotherhood of Sleeping Car Porters, with the direct cooperation of President Franklin D. Roosevelt. Because of Randolph, a great opportunity was presented (and soon manifested) for fair and equal employment rights for skilled African-American laborers - those specifically employed at vital federally-controlled defense industries such as shipbuilding. In 1940, Randolph met with and petitioned Roosevelt to pass an executive order providing equal employment opportunities long denied the black worker, including: fair wages; higher-skilled, better-paying positions; additional training; and managerial posts. To Randolph's disappointment, Roosevelt largely ignored his groundbreaking suggestions; no executive actions came out of their initial meeting. However, on June 25, 1941, two weeks before Randolph was about to lead a massive demonstration on Washington, the president met with Randolph again - and this time, in a watershed moment in the early Civil Rights Movement, an executive order was drafted and issued.[182]

Known as *Executive Order 8802 - Prohibition of Discrimination in the Defense Industry,* the order created the Fair Employment Practices Committee (FEPC) and prohibited discrimination based on race, color or creed. Roosevelt's wording was powerful and to the point:

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[181] The National Archives collections were accessed and recorded by this consultant in 2012. However, 2014 examinations of company magazines have unearthed visual evidence of African-Americans employed as laborers in the former Kearny Point shipyard.

[182] "Executive Order 8802 - Prohibition of Discrimination in the Defense Industry." *The Franklin D. Roosevelt Presidential Library and Museum/National Archives.* Accessed via http://docs.fdrlibrary.marist.edu/ODEX8802.HTML.

Whereas it is the policy of the United States to encourage full participation in the national defense program by all citizens of the United States, regardless of race, creed, color, or national origin, in the firm belief that the democratic way of life within the Nation can be defended successfully only with the help and support of all groups within its borders; and

Whereas there is evidence that available and needed workers have been barred from employment in industries engaged in defense production solely because of consideration of race, creed, color, or national origin, to the detriment of workers' morale and of national unity:

Now, Therefore, by virtue of the authority vested in me by the Constitution and the statutes, and as a prerequisite to the successful conduct of our national defense production effort, I do hereby reaffirm the policy of the United States that there shall be no discrimination in the employment of workers in defense industries or government because of race, creed, color, or national origin, and I do hereby declare that it is the duty of employers and of labor organizations, in furtherance of said policy and of this Order, to provide for the full and equitable participation of all workers in defense industries, without discrimination because of race, creed, color, or national origin…[183]

Executive Order 8802, though progressive, met resistance in the shipbuilding industry and left the FEPC with virtually no enforcement powers, as pointed out in the collected papers of the civil rights giant Clarence M. Mitchell Jr. Non-compliance and ongoing discriminatory attitudes and practices in labor unions were identified as issues within defense industry cultures, including, in 1945, at the Federal Shipbuilding & Drydock Company of Kearny. This was a dramatic reversal of Federal's initial adherence to the order. In fact, on February 2 1942, Mitchell wrote of Federal and nearby Western Electric as being "illustrations of employees who have changed their hiring practices or at least hire nearly in conformity with the requirements of the President's Executive Order No. 8802."[184]

Despite racial equality shortcomings in shipbuilding sites like Federal, many were respected by black social and economic leaders for the large number of local African-Americans they hired for their workforces. As the National Archives and Library of Congress archival photographs prove, black employees at Federal were substantially skilled and contributed significantly to the wartime shipbuilding industry.

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[183] "Executive Order 8802 - Prohibition of Discrimination in the Defense Industry." *The Franklin D. Roosevelt Presidential Library and Museum/National Archives.* Accessed via http://docs.fdrlibrary.marist.edu/od8802t.html.

[184] Mitchell, Clarence Jr. *The Papers of Clarence Mitchell Jr., Volume One: 1942-1943*. Athens, Ohio: Ohio University Press, 2005: 20.

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Mitchell, Clarence Jr. *The Papers of Clarence Mitchell Jr., Volume One: 1942-1943*. Athens, Ohio: Ohio University Press, 2005.

ARCHIVAL IMAGES

National Archives and Records Administration, Records of the Bureau of Ships, 1940 - 1966, Records Relating to Federal Shipbuilding and Dry Dock Company, 03/03/2004 - 04/07/2005.

Library of Congress, Farm Security Administration - Office of War Information Photograph Collection. Federal Shipbuilding and Drydock Corporation; Howard Liberman, photographer, May 1942.

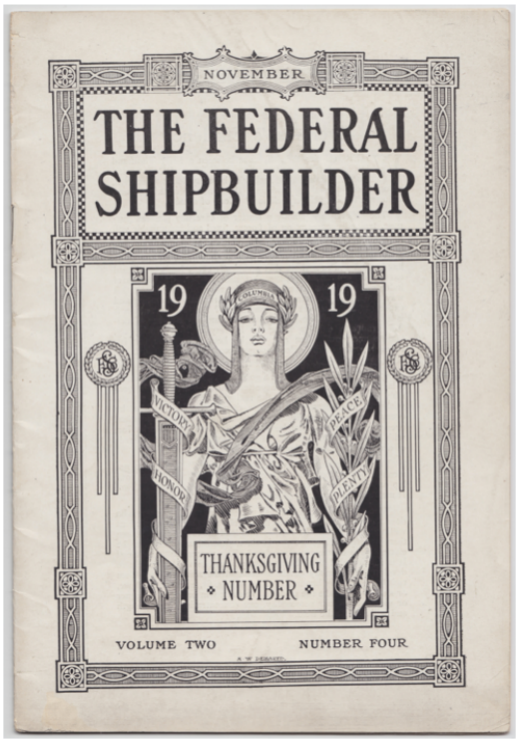

Figure 1, left: Front cover of *The Federal Shipbuilder,* the official company publication; Volume Two, Number Four, November 1919. Figure 2, top right and detail, bottom center: Page 17 of the same issue, showing three African-American "joiners" in an employee group photo. Source: National Archives and Records Administration, Records of the Bureau of Ships, 1940 - 1966, Records Relating to Federal Shipbuilding and Dry Dock Company, 03/03/2004 - 04/07/2005, Container # 4, Ore Carriers, Operating Costs, 19 Feb. 1946 Thru Volume 5, "The Halyard."

Figure 3, top and detail, bottom: *The Federal Shipbuilder,* Volume One, Number Seven, February 1920, page 17, showing African-American "Foundry Department" laborers (top left) in an employee group photo. Source: National Archives and Records Administration, Records of the Bureau of Ships, 1940 - 1966, Records Relating to Federal Shipbuilding and Dry Dock Company, 03/03/2004 - 04/07/2005, Container # 4, Ore Carriers, Operating Costs, 19 Feb. 1946 Thru Volume 5, "The Halyard."

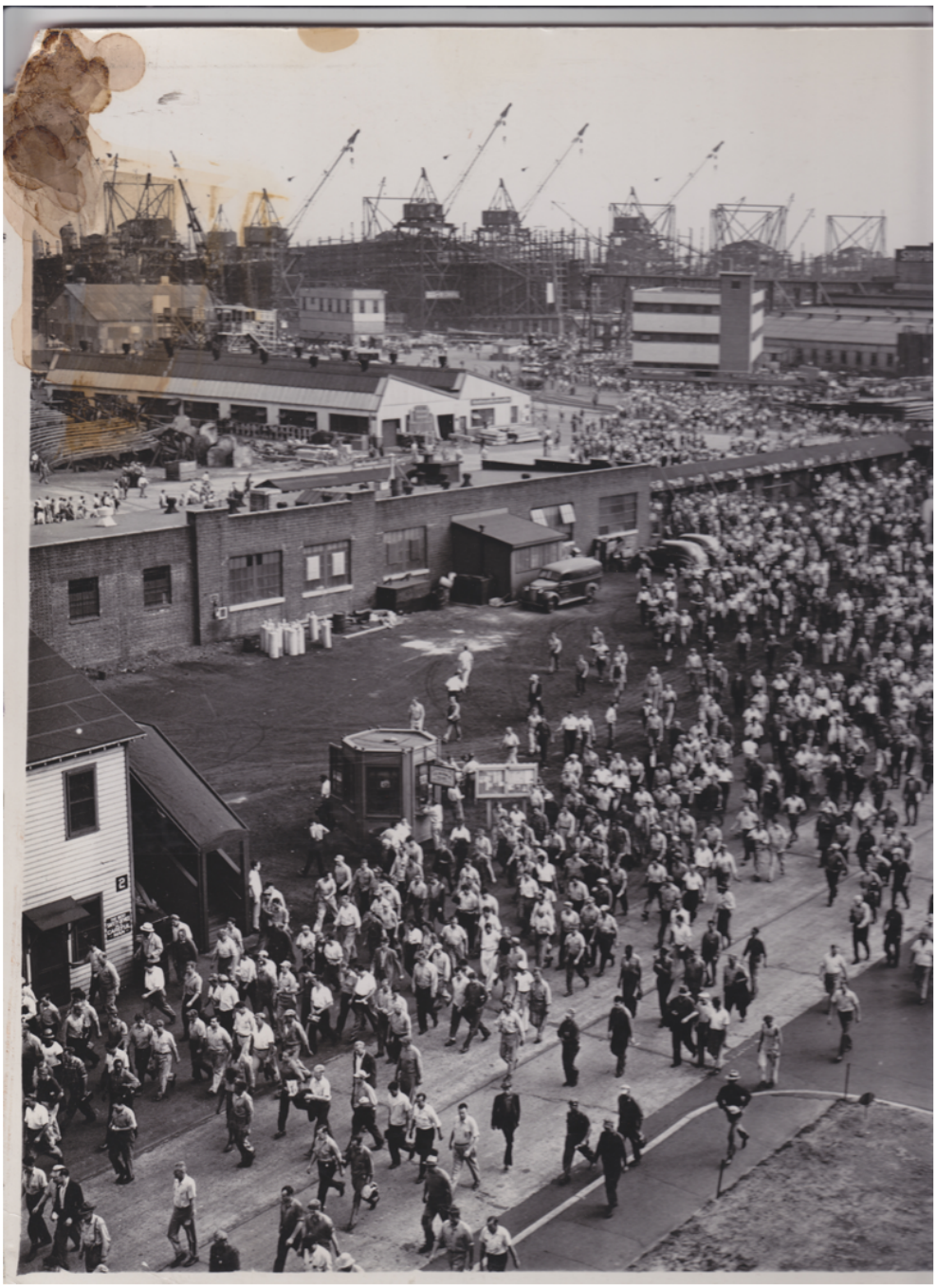

Figure 4: Employee work shift departure at the Federal Shipbuilding & Drydock Company of Kearny, circa-1944. Notice the African-American laborers in the lower foreground, departing in unison with white employees, minus segregational practices so prevalent pre-Executive Order 8802. Source: National Archives and Records Administration, Records of the Bureau of Ships, 1940 - 1966, Records Relating to Federal Shipbuilding and Dry Dock Company, 03/03/2004 - 04/07/2005, Container # 6 - Shipways and Water Front, Oct. 1917 Thru Launching of SS E.A. Bryan, 1944.

Figure 5: “Manpower. Negro shipyard workers. Skills which contributed to America's success in World War I are vital to our efforts in World War II. This Negro riveter is a veteran employee in a large Eastern shipyard. Another Negro broke the world record for riveting in World War I. Federal Shipbuilding and Drydock Corporation. Kearny, New Jersey.” Source: Library of Congress, Farm Security Administration - Office of War Information Photograph Collection. Federal Shipbuilding and Drydock Corporation; Howard Liberman, photographer, May 1942. Reproduction Number: LC-USE6-D-004371 (b&w film neg.)

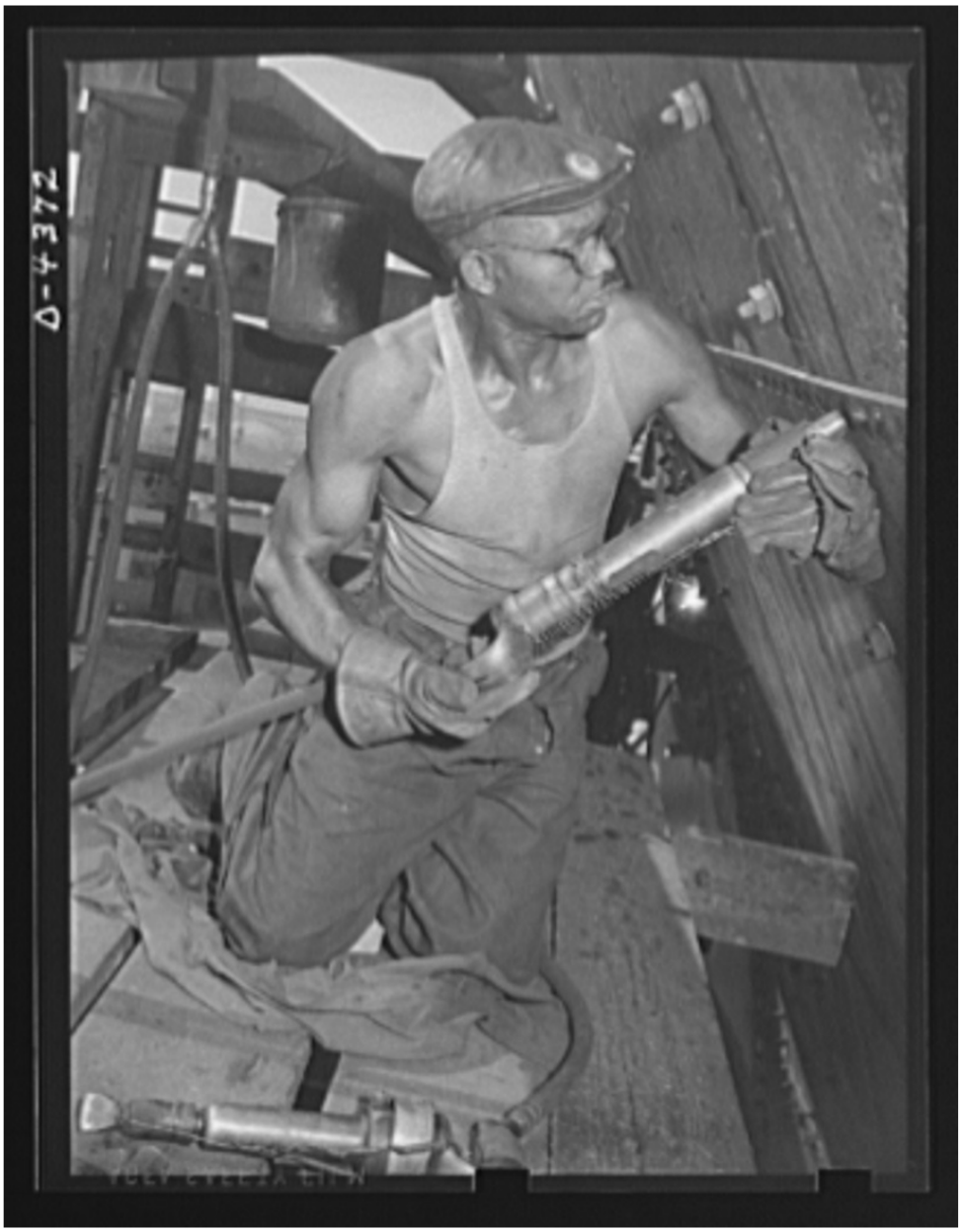

Figure 6: “Manpower. Negro shipyard workers. Skills which contributed to America's success in World War I are vital to our efforts in World War II. This Negro riveter is a veteran employee in a large Eastern shipyard. Another Negro broke the world record for riveting in World War I. Federal Shipbuilding and Drydock Corporation. Kearny, New Jersey.” Source: Library of Congress, Farm Security Administration - Office of War Information Photograph Collection. Federal Shipbuilding and Drydock Corporation; Howard Liberman, photographer, May 1942. Reproduction Number: LC-USE6-D-004372 (b&w film neg.)

Figure 7: “Manpower. Negro shipyard workers. American manpower draws its skills from all citizens alike. This Negro power drill operator is reaming a hole through which rivets will be driven in the building of warships in an Eastern shipyard. Federal Shipbuilding and Drydock Corporation. Kearny, New Jersey.” Source: Library of Congress, Farm Security Administration - Office of War Information Photograph Collection. Federal Shipbuilding and Drydock Corporation; Howard Liberman, photographer, May 1942. Reproduction Number: LC-USE6-D-004374 (b&w film neg.)

Figure 8: “Manpower. Negro shipyard workers. A hot one for Hitler. This worker heats the rivets which go into Uncle Sam's mighty warships being produced in a large Eastern shipyard. Federal Shipbuilding and Drydock Corporation. Kearny, New Jersey.” Source: Library of Congress, Farm Security Administration - Office of War Information Photograph Collection. Federal Shipbuilding and Drydock Corporation; Howard Liberman, photographer, May 1942. Reproduction Number: LC-USE6-D-004374 (b&w film neg.)

Figure 9: “Manpower. Negro shipyard workers. The hammer is still an important tool in ship production. These workers are bending metal fittings on a furnace slab floor, an operation in ship construction at a large Eastern yard. Federal Shipbuilding and Drydock Corporation. Kearny, New Jersey.” Source: Library of Congress, Farm Security Administration - Office of War Information Photograph Collection. Federal Shipbuilding and Drydock Corporation; Howard Liberman, photographer, May 1942. Reproduction Number: LC-USE6-D-004375 (b&w film neg.)

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