USNS *POTOMAC*
(*Shenandoah*)
(*Potomac*)
Beaumont Reserve Fleet, Neches River
Beaumont vicinity
Jefferson County
Texas

HAER TX-114
HAER TX-114

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HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD

USNS *Potomac*
(*Shenandoah*)
(*Potomac*)

HAER No. TX-114

Location:	Beaumont Reserve Fleet; Neches River, Beaumont vicinity, Jefferson County, Texas	
Type of Craft:	Petroleum tanker	
MARAD Design No.:	T5-S-12a	
Builder's Hull No.:	599	
Navy Designation:	T-AOT-181 (formerly T-AO-181, originally T-AO-150)	
Official Registry No.:	297163	
Principal Measurements:	Length (waterline):	591.5′
	Length (oa):	619.9′
	Beam:	83.5′
	Draft:	33.7′
	Displacement (light):	7,333 long tons
	Displacement:	34,800 long tons
	Deadweight:	27,467 long tons
	Gross registered tonnage:	15,739
	Net registered tonnage:	9,556
	Service speed:	15.7 knots
	(The listed dimensions are for the ship as rebuilt in 1964, but it should be noted that draft, displacement, and tonnages are subject to alteration over time as well as variations in measurement.)	
Propulsion:	Steam turbine	
Dates of Construction:	1955–57 (stern); 1963–64 (bow and midsection)	
Designer:	Sun Shipbuilding and Dry Dock Company, Chester, Pa.	
Builder:	Sun Shipbuilding and Dry Dock Company, Chester, Pa. (stern); Newport News Shipbuilding and Dry Dock Company, Newport News, Va. (bow and midsection)	
Original Owner:	U.S. Navy / Military Sea Transportation Service	
Present Owner:	Maritime Administration U.S. Department of Transportation	
Names:	USNS *Potomac* (1957–64, 1976–83) *Shenandoah* (1964–76) *Potomac* (1984–present)	

Disposition: Laid up in the National Defense Reserve Fleet; slated for disposal

Significance: The U.S. Naval Ship (USNS) *Potomac* was one of four tankers built for the U.S. Navy in the mid-1950s to transport refined petroleum products to American bases overseas. After being largely destroyed by an explosion and fire in September 1961, the ship's salvaged stern and machinery were married to a new forward end in 1964, and the reconstructed tanker, under private ownership as the *Shenandoah*, returned under charter to its previous service. Repurchased by the government in 1976, the *Potomac* became the first ship equipped with the navy's Offshore Petroleum Discharge System in 1985. From 1991 to 2001, the vessel supported U.S. forces in the Indian and Pacific oceans through a long-term deployment to the prepositioning force based at the island of Diego Garcia. Now laid up, the *Potomac* is slated for disposal.

Author: Michael R. Harrison, 2010

Project Information: This project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. The Heritage Documentation Programs of the National Park Service, U.S. Department of the Interior, administers the HAER program.

The project was prepared under the direction of Todd Croteau (HAER Maritime Program Coordinator). Jet Lowe (HAER Photographer) created large format photographs, and Michael R. Harrison (Historian) wrote the historical report.

PART I. HISTORICAL INFORMATION

A. Physical History

1. Dates of construction: The Maritime Administration (MARAD) signed the contract for construction of the tanker *Potomac* on November 19, 1954. Construction began in May 1956. The ship was launched October 8, 1956, and delivered January 30, 1957. The ship was destroyed by fire in September 1961.[1]

The *Potomac*'s stern and engine plant were salvaged and married to a new midsection and bow in 1964. The rebuilt ship, named *Shenandoah*, was delivered December 11, 1964.[2]

2. Designer: The Sun Shipbuilding and Dry Dock Company of Chester, Pennsylvania, designed both the original ship and its 1964 reconstruction. The original hull form for this ship and its sisters was informed by model tests conducted at the navy's David Taylor Model Basin in Bethesda, Maryland. Preliminary tests led to revision of the initial hull form, most notably an increase in the size of the bulbous bow, which provided "substantial savings in horsepower within the [vessel's] operating-speed range."[3]

3. Builder: The Sun Shipbuilding and Dry Dock Company built the original ship, which was assigned MARAD hull no. 39 and builder's hull no. 599. The ship was sponsored at its launch by Barbara Robbins (*née* Little), wife of Rear Admiral Thomas H. Robbins, Jr., the president of the Naval War College, Newport, Rhode Island.[4] Workers at the Newport News Shipbuilding and Dry Dock Company, Newport News, Virginia, carried out the ship's post-fire reconstruction. The yard did not assign a new hull number to the reconstruction job.

4. Original plans: The *Potomac* was a welded steel, single-hull petroleum tanker built under the aegis of the Maritime Administration for use by the Military Sea Transportation Service (MSTS, now the Military Sealift Command), the navy agency responsible for all military seaborne cargo operations. To use its designers' description, the ship as completed in 1957 "was of the three-island type—poop, bridge-house structure and forecastle; with curved raked stem, cruiser stern and single-continuous upper deck." The bridge deckhouse enclosed crew accommodations and navigation spaces; the poop deckhouse held additional

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[1] "The Maritime Administration Shipbuilding Program from 1950 to 1984," chart by Frank A. Gerhardt reproducing contract data found in the Records of the Maritime Administration (RG 357), National Archives and Records Administration, http://appendix.usmaritimecommission.de/documents/ documents_main.htm.

[2] Naval Historical Center, "Potomac," *Dictionary of American Naval Fighting Ships*, http://www.history.navy.mil/danfs/p10/potomac-v.htm. An alternative delivery date of Dec. 14, 1964, appears in "SS Shenandoah Rescues Six Victims of Ship Fire," *Sealift Magazine* 17, no. 11 (Nov. 1967): 6–7.

[3] Frank L. Pavlik and David Mylrea, "First of Four—USNS Maumee," *Marine Engineering/Log* 62 (Feb. 1957): 61.

[4] "Navy tanker to be launched," *New York Times*, Oct. 6, 1956, 42.

crew quarters and the propelling machinery. The ship's propulsion system comprised two watertube boilers supplying geared turbines driving a single screw.[5]

5. Original cost: The ship cost approximately $7.3 million.[6]

6. Modifications: The *Potomac*'s bow and cargo tanks, making up about 400' of the vessel's total length, were destroyed by fire in 1961 and subsequently scrapped. The vessel's stern, including the aft deckhouse and the entire propulsion plant, was salvaged and repaired, and the missing forward areas rebuilt. As far as can be determined from limited evidence, the hull was reconstructed along its original lines. The one significant alteration to the appearance of the vessel was the elimination of the midship deckhouse from the ship's design in favor of an expansion of the surviving aft superstructure to hold all crew accommodations and a new navigation bridge.

In 1984, the navy modified the ship to serve as the prototype tanker for the Offshore Petroleum Discharge System, a means of offloading cargo in areas without port facilities. In work carried out at Mobile, Alabama, the ship received eight on-deck reels for flexible conduit, new high-pressure cargo pumps, two stern anchors, and gantries and derricks for stowing and launching the system's submersible mooring platform, buoys, portable shore terminals, and support boats. This equipment remains with the ship today.

7. Names: Following the standard navy practice of naming tank ships for rivers, *Potomac* is named for the river that flows through Maryland and the District of Columbia along their borders with Virginia. The ship's subsequent name, *Shenandoah*, comes from a Virginia river.

B. Historical Context

The Military Sea Transportation Service (MSTS) was established in 1949 to bring together in a single agency all army and navy ocean cargo operations. Initially, the service acquired ships from its predecessor agencies and from the Maritime Commission's reserve fleet, and it operated commercial ships under charter. In fiscal year 1954, its core fleet of government-owned vessels comprised 233 ships carrying about 24 percent of the U.S. military's dry

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[5] Quote from Pavlik and Mylrea, "First of Four—USNS Maumee," 61. The *Potomac*'s original dimensions were: length (oa) 620'; length (bp) 590'; molded breadth 83'-6"; molded depth 42'; design draft 32'; gross tonnage 16,500; deadweight 25,211 long tons; dimensions from Sun Shipbuilding and Dry Dock Co., "Specifications for Construction of a Single Screw Bulk Oil Tanker, Turbine Propulsion, T5-S-12a" (May 1954, with revisions to Oct. 1954), National Archives and Records Administration, College Park, Md., Records of the Maritime Administration (RG 357), Ship Specification Files 1936–2004, box 74. Deadweight tonnage from Hagley Museum and Library, Wilmington, Del., Sun Shipbuilding and Dry Dock Co. photograph collection, http://digital .hagley.org/u?/p268001coll5,1900.

[6] The total estimated construction cost for all four *Maumee*-class tankers is given as $29,071,573, or about $7,270,000 per ship, in U.S. Department of Commerce, *Annual Report of the Federal Maritime Board and Maritime Administration*, 1955, 61.

cargo (45 ships), all of its passengers (61 ships), and about 72 percent of its petroleum (69 ships).[7]

Through a Maritime Administration–administered voluntary tanker pool, private tanker operators made their ships available for the movement of military cargoes during the Korean War, and, from 1951 to mid-1953, this arrangement was fully able to "meet all requirements of the Military Sea Transportation Service for tonnage needs beyond its own capacity." At war's end, however, the continued post-World War II rise in worldwide petroleum consumption led to a shortage of commercial tankers available for U.S. military cargoes. Two approaches were taken simultaneously to fill this gap. The first was to encourage private investment in new tankers that the government could then lease. The second was for the navy to request direct funding for the construction of additional government-owned tankers.[8]

The U.S. government's emergency shipbuilding program during World War II led to an immense surplus of cargo ships after the war, and, consequently, orders for new commercial tonnage from U.S. shipyards were few in the early 1950s. Because this situation jeopardized American shipbuilders' ability to retain skilled workers for future needs, government officials believed it to be a threat to national defense. MSTS, for its part, worked with the Maritime Administration to negotiate "build and charter" contracts with commercial shippers under which new orders were encouraged in exchange for the guarantee of renewable military charters.[9]

In August 1954, Congress authorized the navy to charter up to fifteen tankers "not now in being" for periods up to ten years. In the same legislation, it also authorized the construction of five navy tankers. The authorizing legislation stipulated that the ships be about 25,000 dwt, have a minimum speed of 18 knots, and be constructed in private U.S. shipyards. To spread the financial benefit, the law stipulated that "not more than three tankers authorized by this Act shall be constructed in any one shipyard."[10]

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[7] Rene De La Pedraja, *A Historical Dictionary of the U.S. Merchant Marine and Shipping Industry Since the Introduction of Steam* (Westport, Conn.: Greenwood Press, 1994), 400–402; House Committee on Merchant Marine and Fisheries, *Operations of Military Sea Transportation Service in Relation to Maintenance and Development of the Merchant Marine*, 83rd Cong., 2d sess., Aug. 19, 1954, H. Rep. 2672, 5.

[8] Quote from *Annual Report of the...Maritime Administration*, 1953, 9. *Annual Report of the...Maritime Administration*, 1951, 6; *Annual Report of the...Maritime Administration*, 1952, 9; *Defense Production Act*, Public Law 81-774 (Sept. 8, 1950), *U.S. Statutes at Large* 64 (1950): 798.

[9] *Annual Report of the...Maritime Administration*, 1955, 2, 8. Consistently under pressure from commercial operators, labor unions, and Congress to reduce the amount of military sealift carried in government-owned ships, MSTS negotiated its first build-and-charter contract in July 1952; Salvatore R. Mercogliano, "Tankers: Fuel for Thought," *American Merchant Marine at War* Web site, http://www.usmm.org/msts/tankers.html.

[10] *An Act to authorize the long term chartering of tankers and the construction of tankers by the Secretary of the Navy, and for other purposes*, Public Law 83-575 (Aug. 10, 1954), *U.S. Statutes at Large* 68 (1954): 681; *Annual Report of the... Maritime Administration*, 1955, 2, 8. See also *An Act to amend the Merchant Marine Act, 1936, to provide a national defense reserve of tankers and to promote the construction of new tankers, and for other purposes*, Public Law 83-574 (Aug. 10, 1954), *U.S. Statutes at Large* 68 (1954): 680, which authorized the Maritime Administration to acquire "obsolete vessels" from private shippers in exchange for construction credits against the price of new tankers.

These ships would be the first tankers built expressly for the MSTS since its establishment.[11] As reported in *Marine Engineering/Log*, the navy's Bureau of Ships solicited designs and specifications from a number of shipyards:

> The design submitted by the Sun Shipbuilding and Dry Dock Company was accepted. Bids were submitted on this design with Sun Ship submitting the low bid and Ingalls Shipbuilding Corporation being second low. Since the original legislation specified that only three tankers could be constructed in any one shipyard, two yards would have to participate in the five tankers authorized for Government account. However, the bid prices were such that only four tankers could be built within the appropriation. Sun Ship was awarded three and Ingalls one.[12]

Sun Shipbuilding delivered the first three ships in the class, USNS *Maumee*, USNS *Potomac*, and USNS *Shoshone*, in December 1956, January 1957, and April 1957, respectively. Ingalls Shipbuilding of Pascagoula, Mississippi, delivered the fourth ship, USNS *Yukon*, in May 1957.

The Maritime Administration, which supervised planning, construction, and inspection of the new vessels, designated the design of the *Maumee*-class as T5-S-12a. The navy assigned the USNS *Potomac* the number T-AO-150 when the ship entered service.

Fire and Reconstruction

The *Potomac*'s largely unremarkable early career carrying refined petroleum products between U.S. refineries and depots and American military installations overseas was cut short by a cataclysmic accident in the fall of 1961. On September 26, the ship docked at the Radio Island aviation fuel terminal in Morehead City, North Carolina, bound from Deer Park, Texas, by way of Savannah, Georgia, with a cargo of aviation gasoline and JP-5 jet fuel. The ship's crew proceeded to offload a portion of the cargo into shoreside tanks. Due to an open sea-suction valve, the *Potomac*'s crew inadvertently spilled gasoline into the water during this operation, and an overturned fishermen's lantern or tossed-away cigarette end ignited the fuel after it had spread toward a pair of bridges about 2,000′ away. The fire spread from the bridges back to the ship in seconds. Although the ship's master, Arthur W. Hunter, sounded the fire alarm and attempted to back the ship away from the dock, within a few minutes the heat of the gasoline fire ignited vapors in the ship's empty forward tanks.

It should also be noted that sixteen days after Congress authorized the construction of the *Potomac* and its sisters, it passed the Cargo Preference Act of 1954, which required at least half of government cargoes to travel in privately owned, U.S.-flag commercial vessels. This increased pressure on MSTS and the Maritime Administration to stimulate private investment in new tonnage. Rene De La Pedraja, *Historical Dictionary of the U.S. Merchant Marine*, 400–402; Murray A. Bloom, "The Cargo Preference Act of 1954 and Related Legislation," *Journal of Maritime Law and Commerce* 39, no. 3 (July 2008): 289–91; *Cargo Preference Act*, Public Law 83-664 (Aug. 26, 1954), *U.S. Statutes at Large* 68 (1954): 832.

[11] Naval Historical Center, "Potomac."

[12] Pavlik and Mylrea, "First of Four—USNS Maumee," 59.

"The first explosion, occurring about 7 P.M., was described by a bystander as terrific," the Associated Press reported. Ten minutes later, vapors in the after tanks also ignited. These two blasts sank the ship where it was. The fire burned for five days, threatening in its course to destroy the Radio Island terminal with its 10 million gallons of stored aviation fuel, only a couple of hundred yards from the blaze. *Potomac*'s radio operator and one seaman were killed.[13]

The Associated Press reported, "The forward deck and midship superstructure was a tangle of charred, heat-buckled and, in some instances, melted steel. Inch-thick metal deck plates were wrinkled like paper with long jagged spits [sic]."[14] Despite the utter destruction throughout most of the ship, there was remarkably little damage to the stern, particularly inside and in the mechanical spaces. MSTS officials calculated that it would cost about $7.5 to $8 million to replace the vessel, but if the stern with its propulsion plant could be salvaged and reused, $3.5 million could be saved.[15] In September 1962, MSTS announced it was looking for a ship operator who would accept the stern as partial payment on a new ship. Werner Bamberger of the *New York Times*, wrote,

> What the M.S.T.S. hopes to achieve is this:
>
> Find a ship operator willing to contract with a shipyard for building a "new" vessel; accept the stern section at the value M.S.T.S. places on it, repair the section and have it made a part of a new ship of the same general characteristics of the original vessel.[16]

The new owner would receive a five-year bareboat charter for the reconstructed ship from MSTS, with an option to renew for two additional five-year terms.[17] The navy invited more than 400 companies to bid on the job. Six accepted, and, in July 1963, the navy signed a contract with Keystone Shipping Company of Philadelphia to rebuild the ship. "Under the contract," the *New York Times* reported, "Keystone is to make arrangements for the construction of a new forebody and join it to the salvaged stern at the Newport News Shipbuilding and Dry Dock Company in Newport News, Va. Construction costs for the rebuilt tanker were estimated at $6,000,000." Sun Shipbuilding prepared the plans for the reconstruction, but the salvaged stern had previously been towed to Newport News Shipbuilding for survey in drydock during the Coast Guard's accident investigation. It is

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[13] U.S. Coast Guard, *Marine Board of Investigation into fire and explosion on board the USNS Potomac, at Morehead City, North Carolina, on 26 September 1961 with loss of life* (May 16, 1963), http://www.uscg.mil/hq/cg5/docs/boards/potomac.pdf; "Navy tanker burns at pier," *Baltimore Sun*, Sept. 27, 1961, 8; "Burning tanker threatens to raze terminal," *Chicago Tribune*, Sept. 28, 1961, 18; Helen Outland, "Fire on the water," *Carteret County* (N.C.) *News-Times*, Sept. 28, 2008, http://www.carteretnewstimes.com/articles/2008/09/28/news-times/news/doc48de9abdce513708678022.txt.

[14] "Probers seek clues in hulk of 'Potomac,'" *Spartanburg* (S.C.) *Herald*, Oct. 6, 1961, 1.

[15] "U.S. deal offers ship stern as fee," *New York Times*, Sept. 8, 1962, 46.

[16] Werner Bamberger, "Navy hunting a ship operator to construct half a tanker," *New York Times*, May 12, 1963, S14.

[17] In a bareboat charter, the owner provides only the ship; the chartering body must provide crew, stores, and fuel, and it pays all operating expenses.

presumed that having the stern at Newport News influenced the decision to award the job to that yard. The balance of the *Potomac* wreck was removed from Morehead City in April 1963.[18]

Keystone Shipping took possession of the new ship in December 1964. Renamed *Shenandoah*, the tanker was duly chartered to MSTS. The government purchased the ship outright in January 1976, changed its name back to USNS *Potomac*, and designated it T-AO-181. The navy renumbered it T-AOT-181 in September, 1978.[19]

Offshore Petroleum Discharge System
The navy developed the Offshore Petroleum Discharge System (OPDS) in the early 1980s to allow tankers to land petroleum products where port or terminal facilities were not available. The system was designed to accommodate tankers anchored as far as 4 miles offshore, to be operable within forty-eight hours of arrival, and to be deployed at sea states up to sea state 3 (i.e., 14–15 knot winds and 3.5′–4′ waves). At maximum output the system was designed to handle 1,000 gallons per minute, up to 1.2 million gallons per day.[20]

The OPDS consists of a submersible mooring platform with buoys and hose connections, called the single anchor leg mooring or SALM; 4 miles of flexible conduit carried in reels on deck; two portable beach terminals (beach termination units or BTUs); and five utility boats (OUBs), three equipped as warping tugs, one as a dive boat, and one as a lay repair boat (LRB).

The *Potomac* was selected as the test ship for the prototype installation of the OPDS in 1984. The navy contracted Watters Marine, Inc., of Santa Cruz, California, to manage the test project, and the company "developed and supervised the necessary modifications of the tanker," work that was done in Mobile, Alabama. *Potomac* was equipped with skids on the Upper Deck to stow, launch, and retrieve the mooring platform, and other new main-deck equipment to hold and deploy the hoses and tugs. Two stern anchors were fitted to give the ship four-point mooring capability.

The navy carried out initial demonstrations of the system using the *Potomac* at Cape Charles, Virginia, and Mobile, Alabama. The Cape Charles demonstration was held between September 12 and October 4, 1985, although it was delayed by Hurricane Gloria.[21]

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[18] Bamberger, "Navy hunting a ship operator," S14; "Pact to rebuild tanker Potomac signed by navy with keystone," *New York Times*, Jul. 11, 1963, 42; "Around the U.S. Shipyards," *Marine Engineering/Log* 70, no. 2 (Feb. 1965): 62; U.S. Coast Guard, *Marine Board of Investigation*, 30.

[19] *The Naval Institute Guide to Ships and Aircraft of the U.S. Fleet*, 18th ed. (Annapolis: Naval Institute Press, 2005), 321–22.

[20] U.S. Army, *Concepts and Equipment of Petroleum Operations*, field manual 10-67-1 (April 1998), copy from http://www.globalsecurity.org/military/library/policy/army/fm/10-67-1/index.html.

[21] "Offshore Petroleum Discharge System," *Marine Engineering/Log* 91, no. 10 (Oct. 1986): 51.

C. Operational History

The Military Sea Transportation Service took delivery of the USNS *Potomac* in January 1957 and deployed the ship to deliver refined petroleum products to American bases overseas. While a complete reconstruction of the ship's service career has not been attempted, a few significant incidents have come to light.

Beginning at an unknown date, Marine Transport Lines, Inc. operated the ship for MSTS under contract. The ship was under Marine Transport's management on April 16, 1960, when, fully loaded, it ran aground in the Suez Canal during a severe sandstorm. The *Potomac* was then rammed about an hour later by the American tanker *Green Valley*, sustaining damage of an unknown extent in the stern above the waterline.[22]

The *Potomac* was still under Marine Transport Lines' operation when it was destroyed by fire on September 26, 1961, as described above. After reconstruction as the *Shenandoah*, the ship was owned by Keystone Shipping Company and operated under charter by the Military Sealift Command (MSC, as MSTS was renamed in August 1970). The vessel was largely deployed in support of American operations in Southeast Asia. The navy purchased the *Shenandoah* from Keystone Shipping in January 1976, and returned its name to *Potomac*.

On August 11, 1967, the crew of the *Shenandoah* rescued six crewmen, all with serious injuries, from the Japanese fishing boat *Shoichi Maru*, which had suffered an engine room fire the day before. The tanker took the men to Wake Island before resuming course for Port Arthur, Texas.[23]

On August 5, 1977, while resupplying the U.S. Air Force Base at Thule, Greenland, the *Potomac* struck an iceberg, holing one of its fuel tanks and spilling 107,000 gallons of bunker C oil into Melville Bay. A National Oceanographic and Atmospheric Administration report concluded that the spill significantly increased the pollution in the remote bay but likely had no lasting ecological effect.[24]

Repaired and returned to service after this accident, the ship remained in service until September 26, 1983. It entered the Maritime Administration's National Defense Reserve Fleet (NDRF), at Suisun Bay, California, on March 5, 1984, only to be withdrawn the following April 5 to serve as the prototype vessel for the Offshore Petroleum Discharge System (OPDS).[25]

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[22] "Suez sandstorm grounds 3 ships," *Miami News*, Apr. 17, 1960, 1; "Divers inspect 2 U.S. ships that collided in Suez," *Los Angeles Times*, Apr. 18, 1960, 22; "Divers check 2 ships in Suez Canal crash," *Baltimore Sun*, Apr. 18, 1960, 2.

[23] "SS Shenandoah Rescues Six Victims of Ship Fire," 6–7.

[24] Peter L. Grose, James S. Mattson, and Hanne Peterson, *USNS* Potomac *Oil Spill, Melville Bay, Greenland, 5 August 1977* (National Oceanic and Atmospheric Administration report NOAA-S/T 79-202, 1979).

[25] *Naval Institute Guide,* 321; Maritime Administration custody cards for *Potomac*, https://pmars.marad .dot.gov/detail.asp?Ship=3959.

The OPDS tests proved satisfactory, and the installation was retained aboard the ship. Similar equipment was subsequently installed as well on four additional MSC tankers, the *American Osprey*, the *Chesapeake*, the *Petersburg*, and the *Mount Washington*. The *Potomac* was returned to the NDRF after the test, although this time it was assigned to the anchorage at Beaumont, Texas, which it entered April 29, 1986. On December 9, 1990, the ship was withdrawn from reserve for activation before being deployed to the Persian Gulf to support Operations Desert Shield and Desert Storm. At the end of the war in the Persian Gulf, MSC assigned the vessel to the Afloat Prepositioning Force at the island of Diego Garcia, 1,100 miles south-southwest of Colombo, Sri Lanka, in the Indian Ocean.[26]

MSC's Afloat Prepositioning Force was developed in the early 1980s to reduce the time needed to deliver U.S. military equipment and supplies to foreign theaters of operation in wartime. Ships and supplies were "prepositioned" at selected anchorages across the globe for quick deployment when needed. Sailing from its base at Diego Garcia, the *Potomac* took part in famine relief efforts in Rwanda in 1994 and otherwise supported U.S. operations in the Persian Gulf and exercises in the Indian Ocean. The ship was sent to the Atlantis Shipyard in Singapore for repairs and maintenance at least annually from 1997 to 2000. It returned to the U.S. in 2001 and entered the NDRF at Beaumont, Texas. The ship was downgraded to non-retention status in October 2007. As of the end of 2010, the ship is classed for disposal.[27]

PART II. STRUCTURAL / DESIGN INFORMATION

A. General Description

1. Overall: According to Sun Shipbuilding and Dry Dock Company's specifications, the *Potomac*, as originally constructed, was "a single screw, double reduction geared, turbine-driven bulk oil tanker, with a straight raked stem and cruiser stern; having one complete deck, closed Forecastle with tonnage opening, Bridgehouse and Poop erection."[28]

The welded-steel ship was constructed with a single hull except beneath the machinery spaces. The ship was longitudinally framed except at the peaks, where it was transverse framed. The hull was divided by watertight and oiltight transverse bulkheads into sixteen compartments containing, fore to aft:

- forepeak and chain locker over forward deep tanks for ballast
- dry-cargo hold over forward deep tanks for reserve fuel
- forward pump room for bilge-ballast and fuel-oil handing
- nine cargo compartments
- cargo pump room

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[26] Maritime Administration custody cards for *Potomac*.

[27] Maritime Administration property management record for *Potomac*, https://pmars.marad.dot.gov/detail.asp?Ship=3959.

[28] "Specifications for Construction," H1.2.

- machinery spaces
- afterpeak

The nine cargo compartments were additionally subdivided into twenty-seven tanks through the incorporation of two continuous longitudinal bulkheads running through the oil-cargo spaces.

The bridge deckhouse was eliminated from the ship's design during the 1963–64 reconstruction, although the bulkhead and compartment arrangements were largely replicated.

2. Decks: In the *Potomac*'s original configuration, the ship's enclosed forecastle on the Upper Deck contained boatswain's stores, package-freight space, paint room, paint storage room, carbon-dioxide room, carpenter shop, and lamp room.[29]

Just forward of amidships on the Upper Deck, the bridge deckhouse contained stowage space. Above this, the Bridge Deck held accommodations for the purser and the first, second, third, and fourth mates (each with its own toilet and shower), plus the officers' lounge, master's pantry, ship's office, linen locker, cleaning-gear locker, electric station, oilskin locker, and public toilet. The Upper Bridge Deck next above contained the captain's office, stateroom, toilet, and shower; the radio operator's stateroom with toilet and shower; the radio room; a battery locker; and the deck locker. The Boat Deck held a fan room and two 15-ton-capacity potable water tanks. The Navigating Bridge Deck comprised the wheel house, chart room, gyro and radar room, and a toilet. This series of decks within the bridge deckhouse was surmounted by a radar and signaling mast.[30]

On the Upper Deck aft, the poop deckhouse contained crew's quarters, crew toilets and showers, laundry, drying room, linen locker, cleaning gear locker, oilskin locker, steward's sundry stores, butcher shop, dry stores, refrigerated stores, carbon-dioxide room, fresh-water tanks, and steering gear. The Poop Deck, next above the Upper Deck, contained the chief engineer's stateroom, day room, and toilet/shower; staterooms with private toilets and showers for the first, second, third, and fourth assistant engineers; plus accommodations for the junior engineers, the chief cook, and the steward. This deck also contained the galley, scullery, officers' mess, officers' pantry, the crew's mess, a combined petty officers' mess and lounge, and the crew recreation room. The Boat Deck aft contained the hospital and the emergency diesel generator room.[31]

Two fore-and-aft gangways originally connected the forecastle and the two deckhouses.

The bridge deckhouse was eliminated from the ship's design in the 1963–64 reconstruction. The poop deckhouse was repaired and enlarged at its forward end to contain all the ship's

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[29] "Specifications for Construction," H1.4.

[30] "Specifications for Construction," H1.4.

[31] "Specifications for Construction," H1.4–H1.5.

crew accommodation and a new navigating bridge. The distribution of specific rooms across the ship's new deck arrangement has not been determined.

3. Cargo holds: As built in 1957, the *Potomac*'s twenty-seven cargo tanks gave the ship a capacity of 7,992,600 gallons (190,300 barrels). The ship's capacity today with the OPDS is 7,345,800 gallons (174,900 barrels). To allow a service speed of 18 knots and a range of 18,000 nautical miles, the ship was designed with a large fuel-oil capacity of 4,300 tons. The ship has a limited dry-cargo capacity of about 30,000 cu. ft.[32]

4. Crew accommodations: The *Potomac* originally had accommodations for a crew of fifty-two. Today, as outfitted with the Offshore Petroleum Discharge System, the ship carries a crew of thirty-seven.[33]

5. Safety: A Walter Kidde and Company carbon-dioxide system was originally installed for fire suppression in the machinery spaces and pump room. Cargo-oil and fuel-bunker fire suppression was provided through a steam-smothering system. Conventional sea-water fire mains and hydrants were fitted on deck.[34]

The original lifesaving equipment comprised four 24' steel lifeboats served by single-pivot gravity davits, two boats on the bridge-deckhouse Boat Deck, and two on the aft Boat Deck abreast the funnel. One of the forward boats was motor propelled. Today the ship has two lifeboats supplemented by canister rafts.

B. Mechanical Features

1. Engine Plant: The ship is propelled by a single set of cross-compound turbines comprising a high-pressure turbine and a low-pressure turbine. These are coupled to the drive shaft and a five-blade manganese-bronze right-hand screw through a double-helical, double-reduction gear. Astern elements are built into the low-pressure turbine. The engine is rated at 20,460 maximum continuous shp generating 104 rpm at the propeller. Originally, normal power was 18,600 shp, generating 101 rpm; today, normal power is 15,000 shp. Westinghouse Electric Corporation built the engines and reduction gear.[35]

2. Boilers: The ship has two two-drum air-encased forced-draft watertube boilers, manufactured by the Combustion Engineering Company. As originally constructed, each was fired by four "Hex-Press"–type mechanical atomizing oil burners supplied by the Todd Combustion Equipment Company. The system was designed to supply steam to the high-

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[32] Pavlik and Mylrea, "First of Four," 59; Maritime Administration property management record for *Potomac*; "Specifications for Construction," H1.9.

[33] The ship's original complement comprised eighteen men in the deck department, nineteen in the engine department, ten in the stewards' department, two in the pursers' department, and three spare berths. "Specifications for Construction," H1.9–H1.10; Pavlik and Mylrea, "First of Four," 63; *Naval Institute Guide*, 321.

[34] Pavlik and Mylrea, "First of Four," 64, 67.

[35] Pavlik and Mylrea, "First of Four," 64; *Naval Institute Guide*, 321; "Specifications for Construction," 50.2, 51.1; Maritime Administration property management record for *Potomac*.

pressure turbine chest at 585 psig and 845 degrees F on a vacuum of 28.5 inches of mercury. Combustion gases exhaust through a single funnel aft.[36]

3. Electrical system: The ship's electrical system comprises two General Electric 500-kW steam-powered turbo generators. Emergency electrical generation is provided by a General Motors 75-kW generator driven by a Cummins Diesel engine.[37]

4. Cargo handling arrangements: MSTS requested that the *Maumee*-class tankers be capable of transporting up to four grades of refined petroleum at a time, including bunker oil, diesel oil, jet fuel, and aviation gasoline, and the cargo pumping arrangements were designed to handle these fuels and keep them separate.

Four rotary pumps are provided for main cargo handing and cargo-tank stripping, each with a capacity of 4,000 gallons per minute. The pumps are driven by dedicated steam turbines rated at 450 hp / 1,750 rpm. Access to the forward and cargo pump rooms is provided through entrance houses on the Upper Deck.[38]

The ship was originally equipped with two forward kingposts supporting one 5-ton boom each, two midship kingposts supporting one 2-ton and one 5-ton boom each, and two aft kingposts supporting one 2-ton boom each.[39]

5. Steering gear: The *Potomac* is equipped with a Smith-Lidgerwood hydroelectric steering gear. It is controlled by telemotor from the wheelhouse with subsidiary mechanical control from an aft steering station and within the steering-gear room itself.[40]

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[36] Pavlik and Mylrea, "First of Four," 65; *Naval Institute Guide*, 321.

[37] Pavlik and Mylrea, "First of Four," 66.

[38] Pavlik and Mylrea, "First of Four," 64.

[39] Pavlik and Mylrea, "First of Four," 61.

[40] "Specifications for Construction," H1.6; Pavlik and Mylrea, "First of Four," 64.

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APPENDIX I: ORIGINAL COMPLEMENT OF THE USNS *POTOMAC*

From *Specifications for Construction of a Single Screw Bulk Oil Tanker, Turbine Propulsion, T5-S-12a*

Deck Department		
Captain	1	
First mate	1	
Second mate	1	
Third mate	1	
Fourth mate	1	
Radio operator	1	
Bosun	1	
A.B. seamen	6	
A.B. maintenance men	2	
Ordinary seamen	3	Total: 18
Engine Department		
Chief engineer	1	
First assistant engineer	1	
Second assistant engineer	1	
Third assistant engineer	1	
Fourth assistant engineer	1	
Junior engineers	3	
Oilers	3	
Firemen-watertenders	3	
Pumpmen	2	
Wipers	3	Total: 19
Steward's Department		
Chief steward	1	
Chief cook	1	
Second cook	1	
Third cook	1	
Galleyman	1	
Messmen	2	
Utility men	3	Total: 10
Purser's Department		
Purser	1	
Yeoman-storekeeper	1	Total: 2
Spare berths	3	
		Grand total: 52

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USNS *POTOMAC* HAER TX-114
(*Shenandoah*)
(*Potomac*)
Beaumont Reserve Fleet, Neches River
Beaumont vicinity
Jefferson County
Texas

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Jet Lowe, photographer, April 2009

TX-114-1	Bow view. Moored to the left of the *Potomac* is the tanker *Chesapeake*. Moored to the right are tankers *American Osprey* and *Mount Vernon*.
TX-114-2	Port bow view. The stern of the tanker *Chesapeake* lies to the left; the stern of the tanker *American Osprey* lies to the right.
TX-114-3	Stern view. The bow of the tanker *Chesapeake* lies to the right; the bow of the tanker *American Osprey* lies to the left.
TX-114-4	View of the waters of the Neches River showing the lower hulls of the tankers *American Osprey*, *Potomac*, and *Chesapeake* moored together
TX-114-5	View of the port bow taken from the tanker *American Osprey*.
TX-114-6	View of the poop deck showing mooring equipment, rudder, and propeller. The bow of the tanker *Chesapeake* is visible in background. View taken from the bow of the tanker *American Osprey*.
TX-114-7	Detail view of the poop deck looking to starboard showing port mooring windlass and framework for an awning.
TX-114-8	View of forecastle looking forward showing windlass.

TX-114-9	View from the port side showing the Single Anchor Leg Mooring (SALM), a component of the Offshore Petroleum Discharge System. Photograph taken from the tanker *American Osprey*. The tanker *Chesapeake* appears in the background.
TX-114-10	Portside view of the deckhouse and funnel taken from the navigating bridge deck of the tanker *American Osprey.*
TX-114-11	Portside view of deckhouse, funnel, and lifeboat taken from the upper deck of the tanker *American Osprey.*
TX-114-12	View of the bridge deck looking forward showing hatches over the top of the engine room trunk and the aft side of the funnel.
TX-114-13	View looking aft from the boat deck over the poop deck showing the control console for the two poop-deck windlasses.
TX-114-14	Detail view of control console for the poop-deck windlasses.
TX-114-15	View of forecastle looking aft showing the anchor chains, windlass, and forward kingposts.
TX-114-16	View of portside lifeboat looking aft.
TX-114-17	Detail view looking aft of fire-suppression nozzle amidships on the spar deck walkway. The forward edge of the Single Anchor Leg Mooring (SALM) appears in the background.
TX-114-18	Detail view amidships, starboard side, looking to port, showing guides for deploying the petroleum conduits of the Offshore Petroleum Discharge System.
TX-114-19	Detail view amidships, looking toward the port rail, showing guides for deploying the petroleum conduits of the Offshore Petroleum Discharge System. The mooring base of the Single Anchor Leg Mooring aboard the tanker *American Osprey* is visible in the background.
TX-114-20	Detail view amidships, looking toward the starboard rail, showing guides for deploying the petroleum conduits of the Offshore Petroleum Discharge System. The tanker *Chesapeake* is visible in the background.

TX-114-21 View of upper deck, starboard side, looking aft. Eight conduit reels, components of the Offshore Petroleum Discharge System, appear in the foreground. Photograph taken from the tanker *Chesapeake*. The tankers *American Osprey* and *Mount Vernon* appear in the background.

TX-114-22 View from the forecastle looking aft along the length of the spar-deck gangway. Conduit reels, components of the Offshore Petroleum Discharge System, appear in the middle distance; the Single Anchor Leg Mooring (SALM) appears in the background forward of the deckhouse. Another SALM aboard the tanker *American Osprey* appears at right.

TX-114-23 View of port side looking forward showing the rear of the Single Anchor Leg Mooring, a component of the Offshore Petroleum Discharge System (OPDS). The cylindrical main mooring buoy is secured on its side atop the barge-like mooring base, which itself rests on canted skids to facilitate deployment over the tanker's port side. Five support boats for the OPDS aboard the tanker *Chesapeake* appear in the right background.

TX-114-24 Portside view showing the deckhouse. The cylindrical main mooring buoy and the barge-like mooring base are parts of the Single Anchor Leg Mooring, a component of the Offshore Petroleum Discharge System.

TX-114-25 View looking forward from the port side of the bridge deck showing the Single Anchor Leg Mooring, a component of the Offshore Petroleum Discharge System.

TX-114-26 View from the starboard side of the navigating bridge deck looking forward over the Single Anchor Leg Mooring.

TX-114-27 Detail view looking to port showing launching cradle for the Single Anchor Leg Mooring.

TX-114-28 View looking forward on the starboard side of catwalk underneath the Single Leg Anchor Mooring.

TX-114-29 View looking aft on the starboard side of catwalk underneath the Single Leg Anchor Mooring.

TX-114-30	Interior view of navigating bridge looking to starboard.
TX-114-31	Interior view of cargo office looking forward showing pump controls for the Offshore Petroleum Discharge System.
TX-114-32	Interior view of cargo office, looking to port.
TX-114-33	Interior view of steering gear compartment, looking aft.
TX-114-34	Interior view of engine room, looking forward.
TX-114-35	Interior view of the engine room looking aft. The high-pressure turbine appears on the left; the low-pressure turbine appears on the right.
TX-114-36	Interior view of boiler room showing the aft side of the boilers looking to starboard.
TX-114-37	Interior view of engine room looking forward showing turbine control panel on left and boiler control panel on right.

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Jet Lowe, photographer, April 2009

TX-114-38 (CT)	Portside view showing the deckhouse. The cylindrical main mooring buoy and the barge-like mooring base are parts of the Single Anchor Leg Mooring.
TX-114-39 (CT)	Portside view of the deckhouse and funnel taken from the navigating bridge deck of the tanker *American Osprey.*

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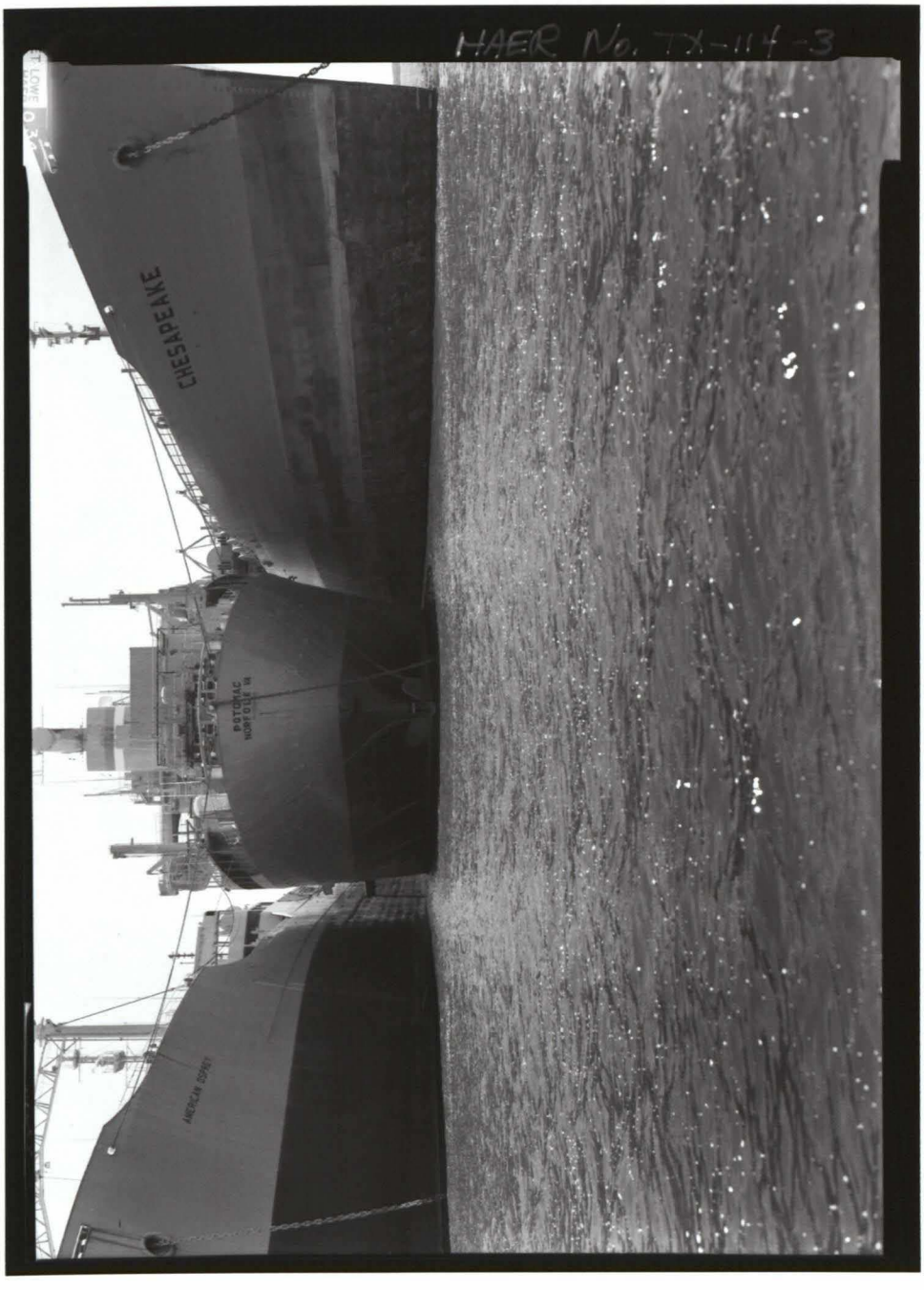

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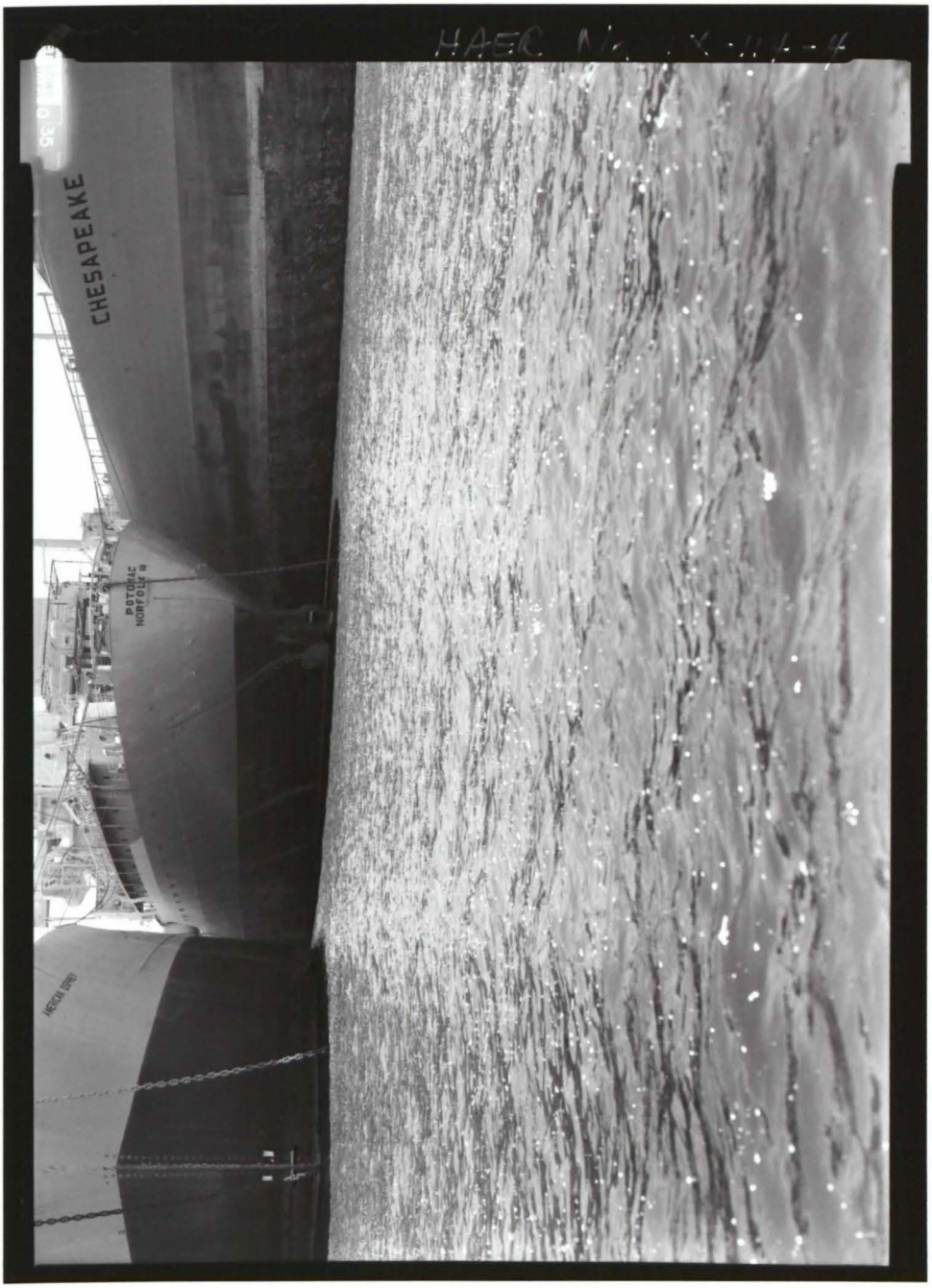

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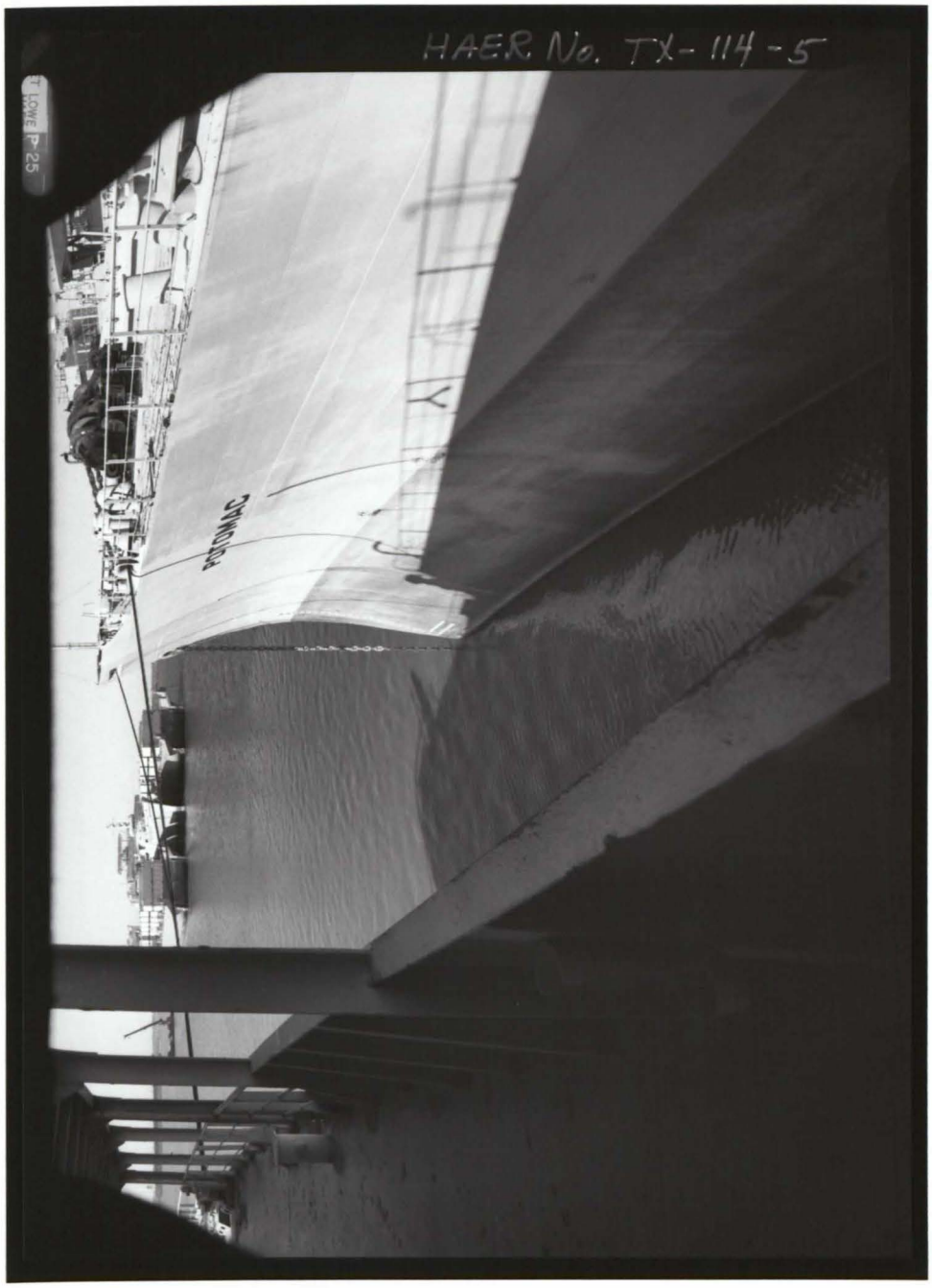

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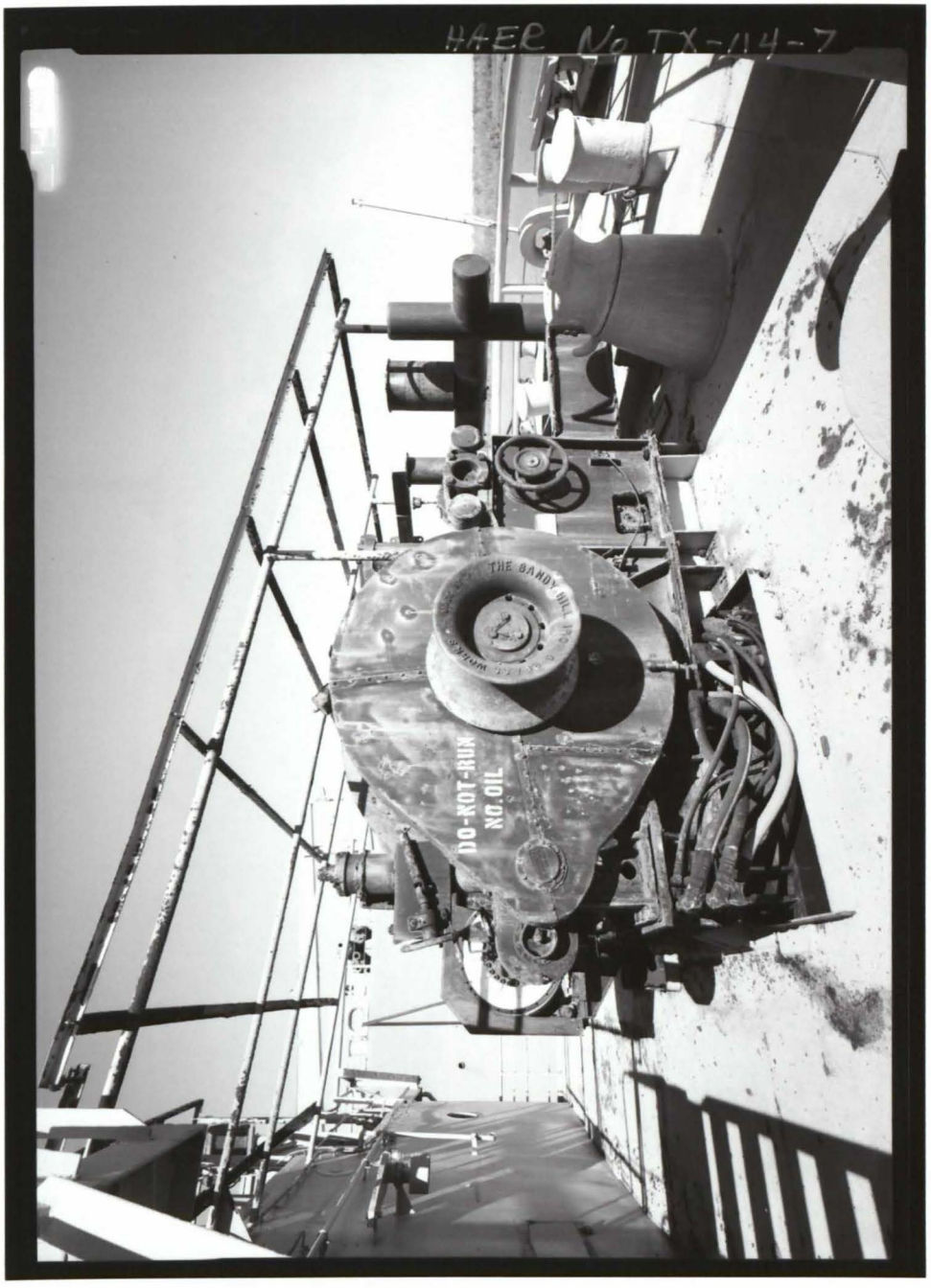

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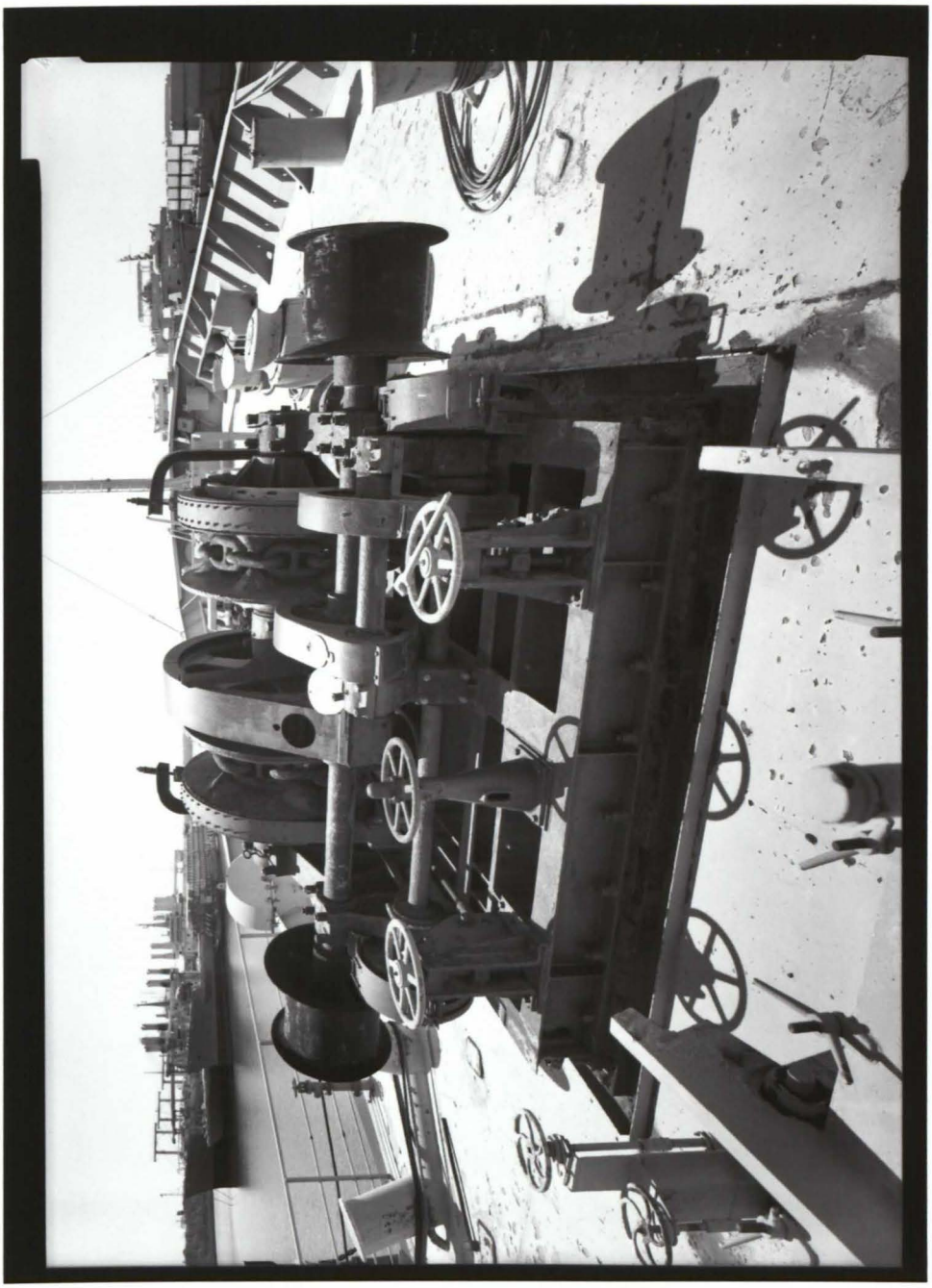

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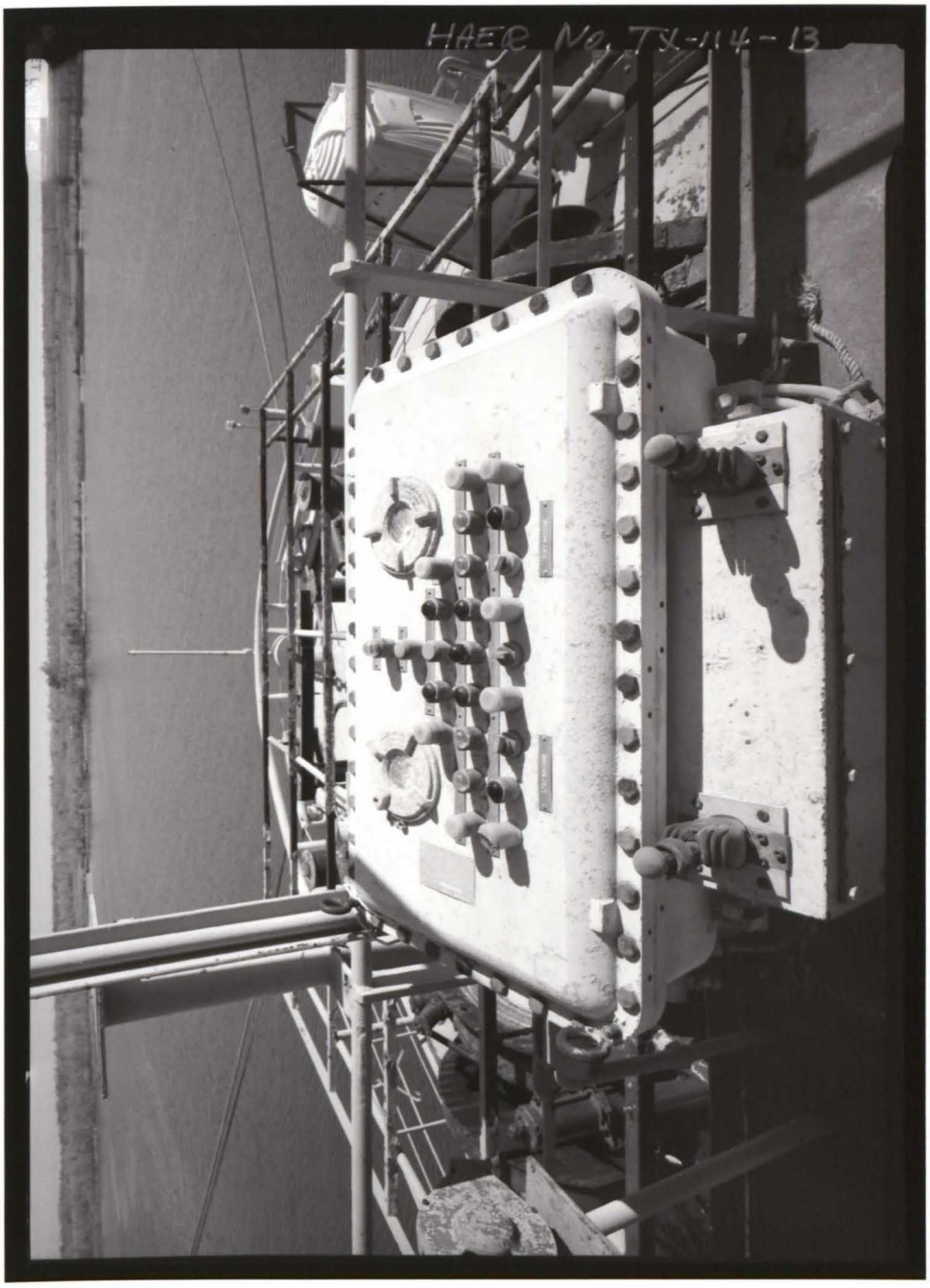

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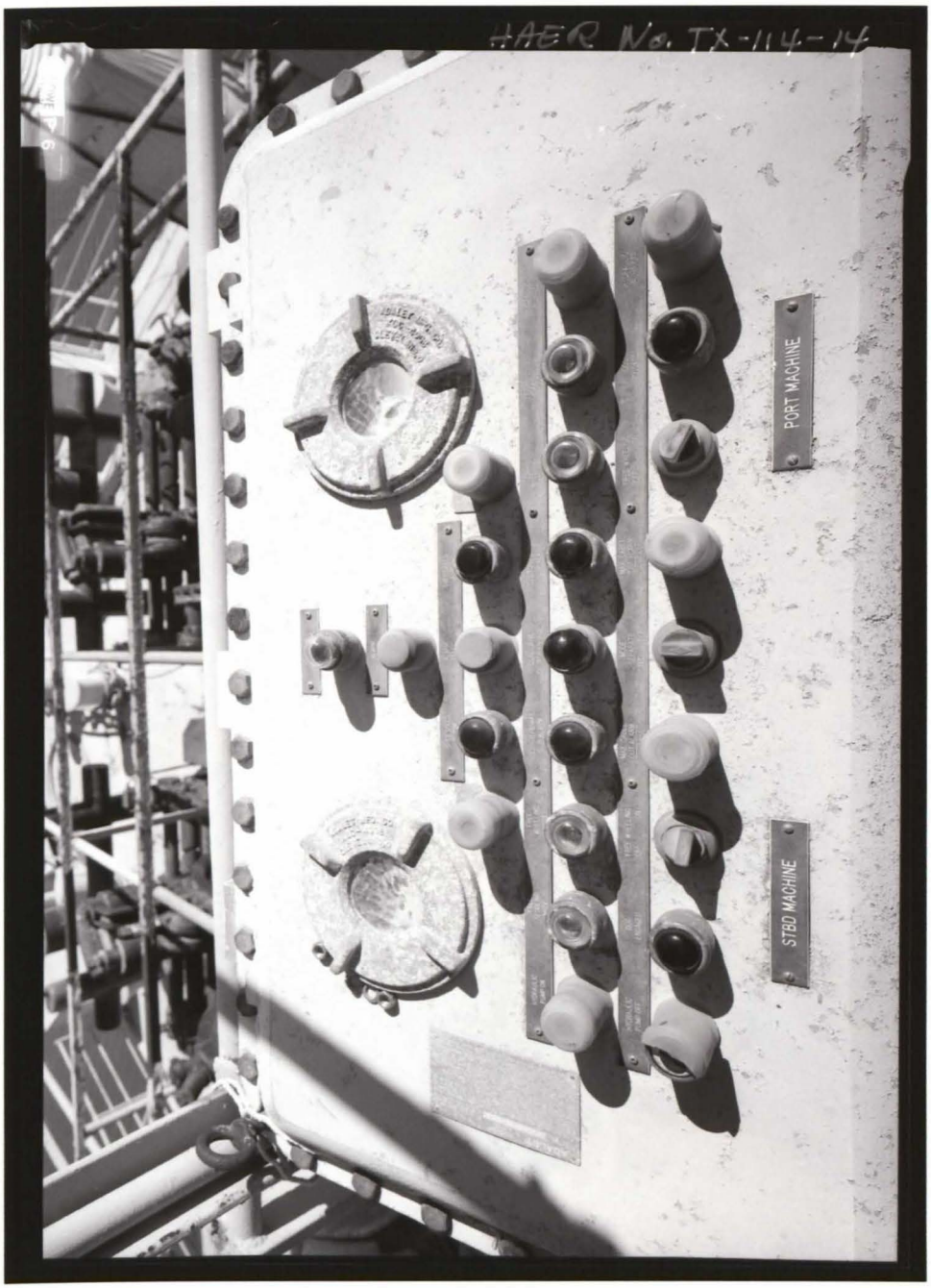

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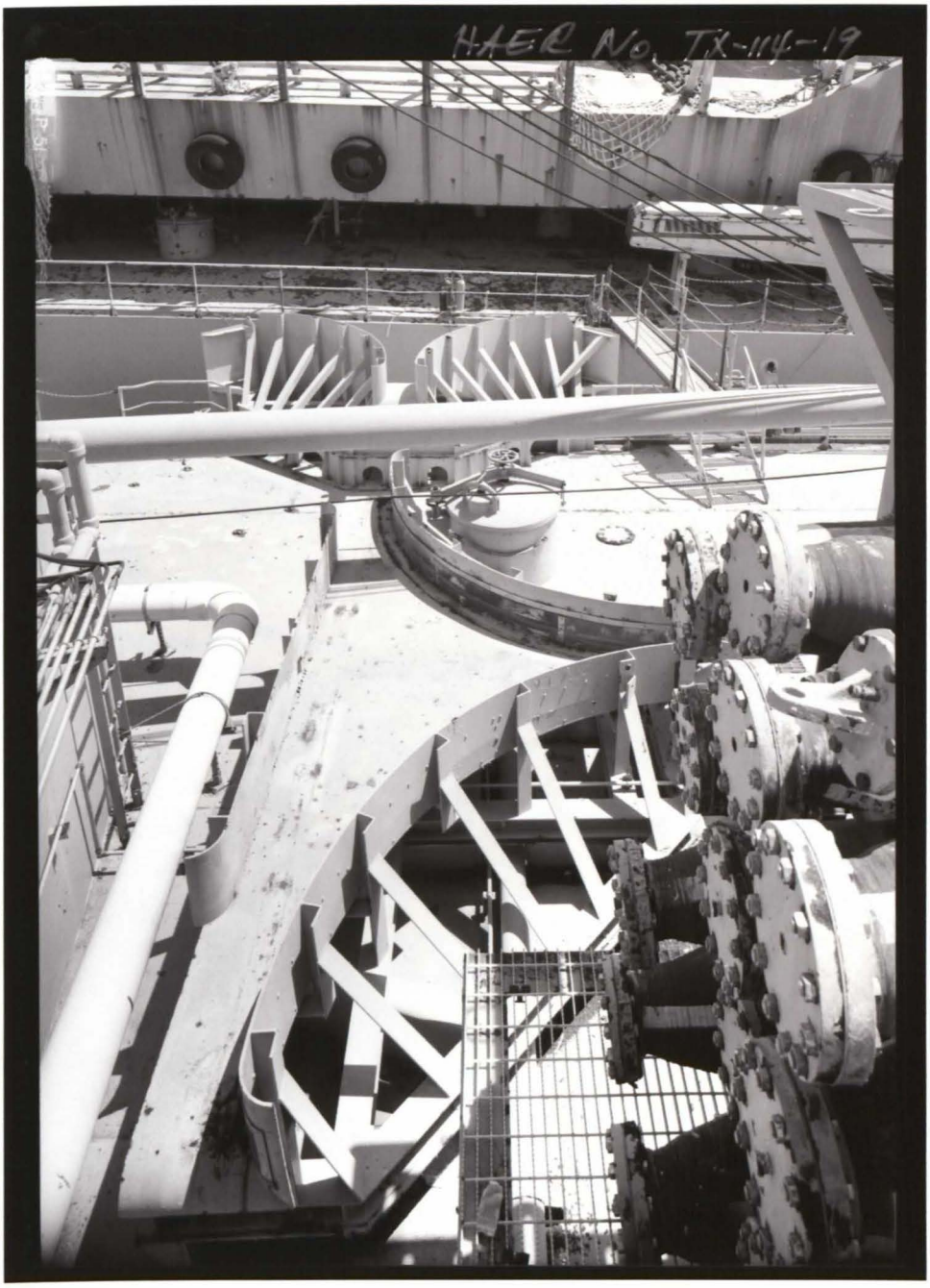

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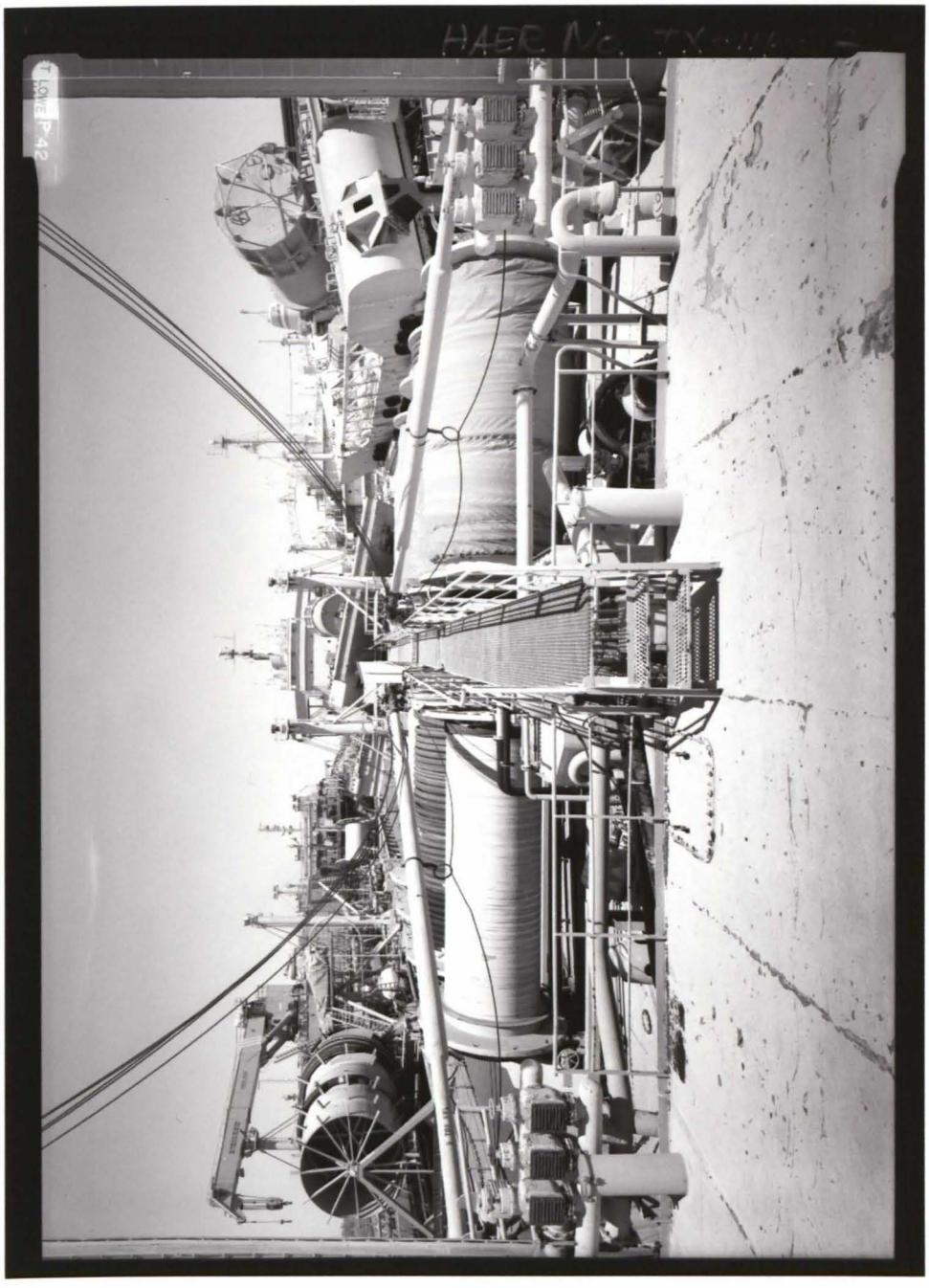

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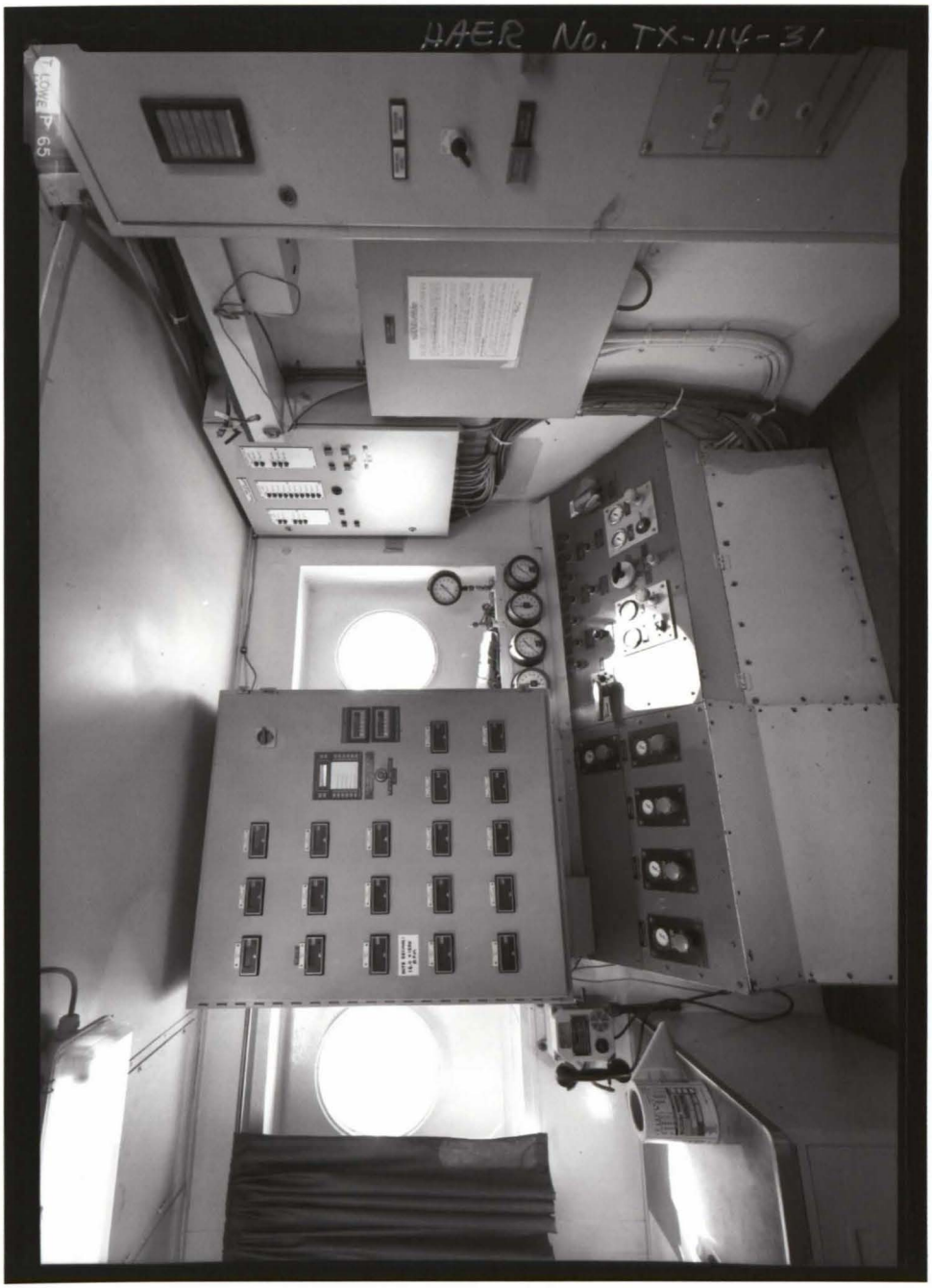

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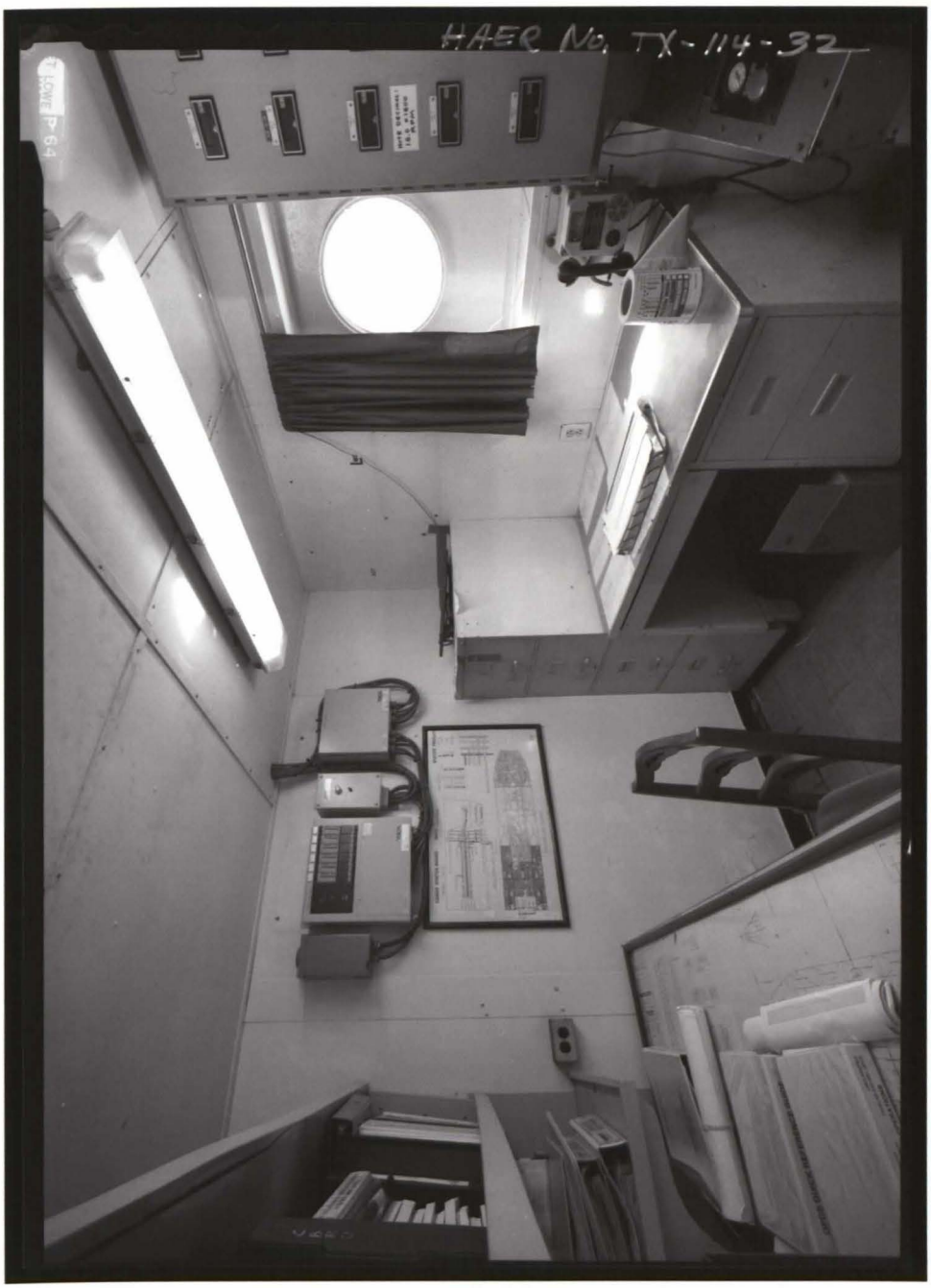

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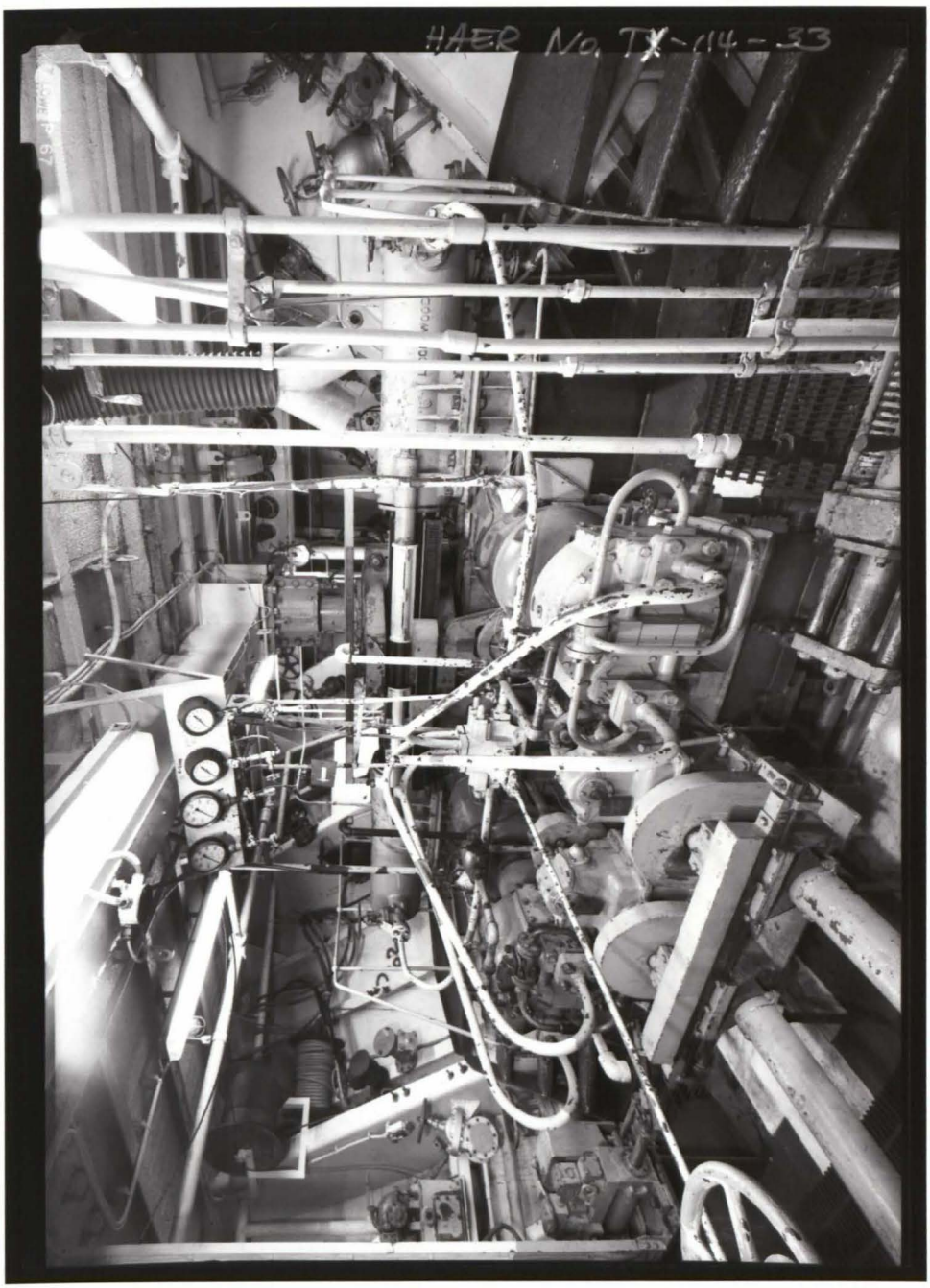

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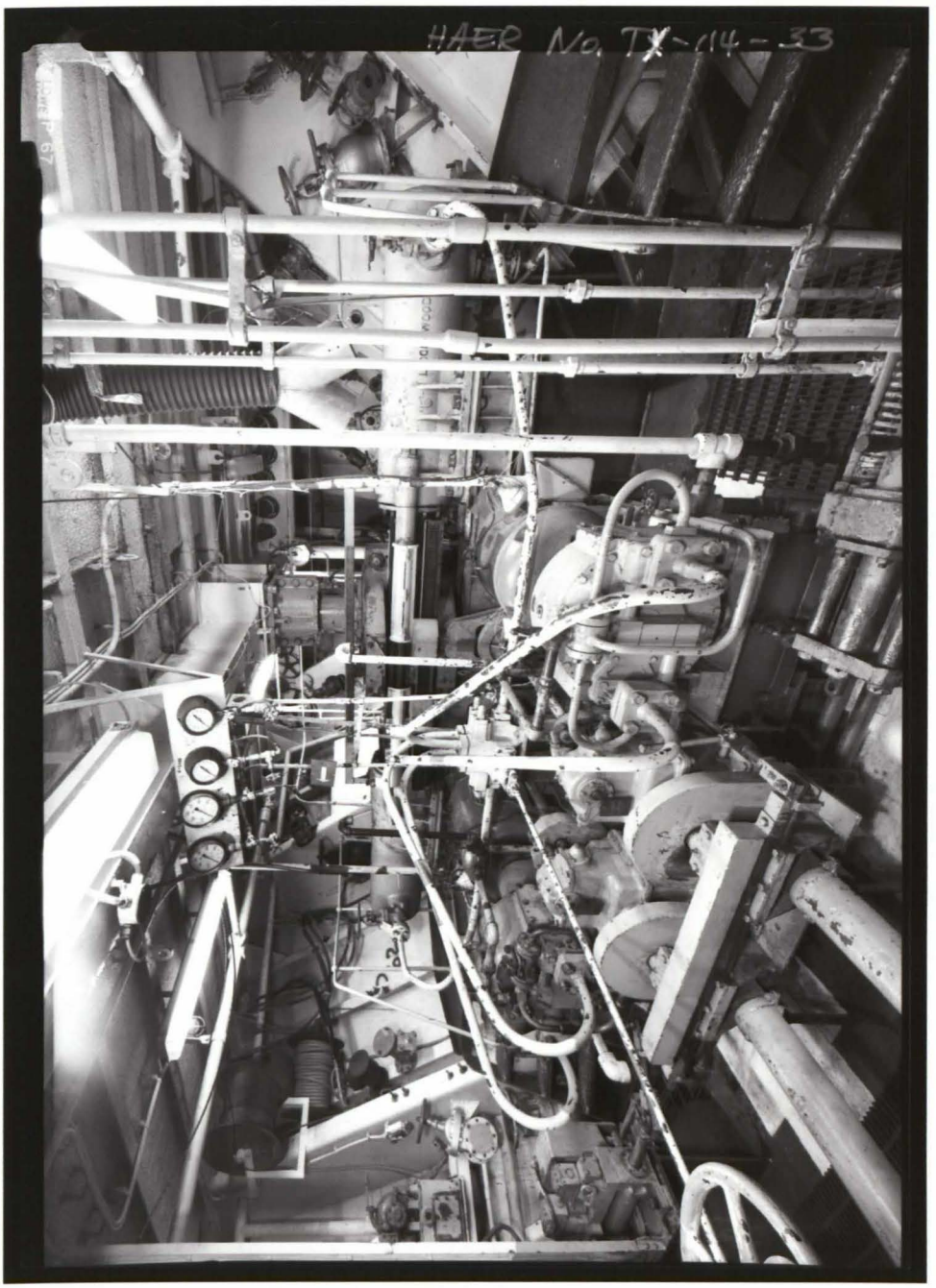

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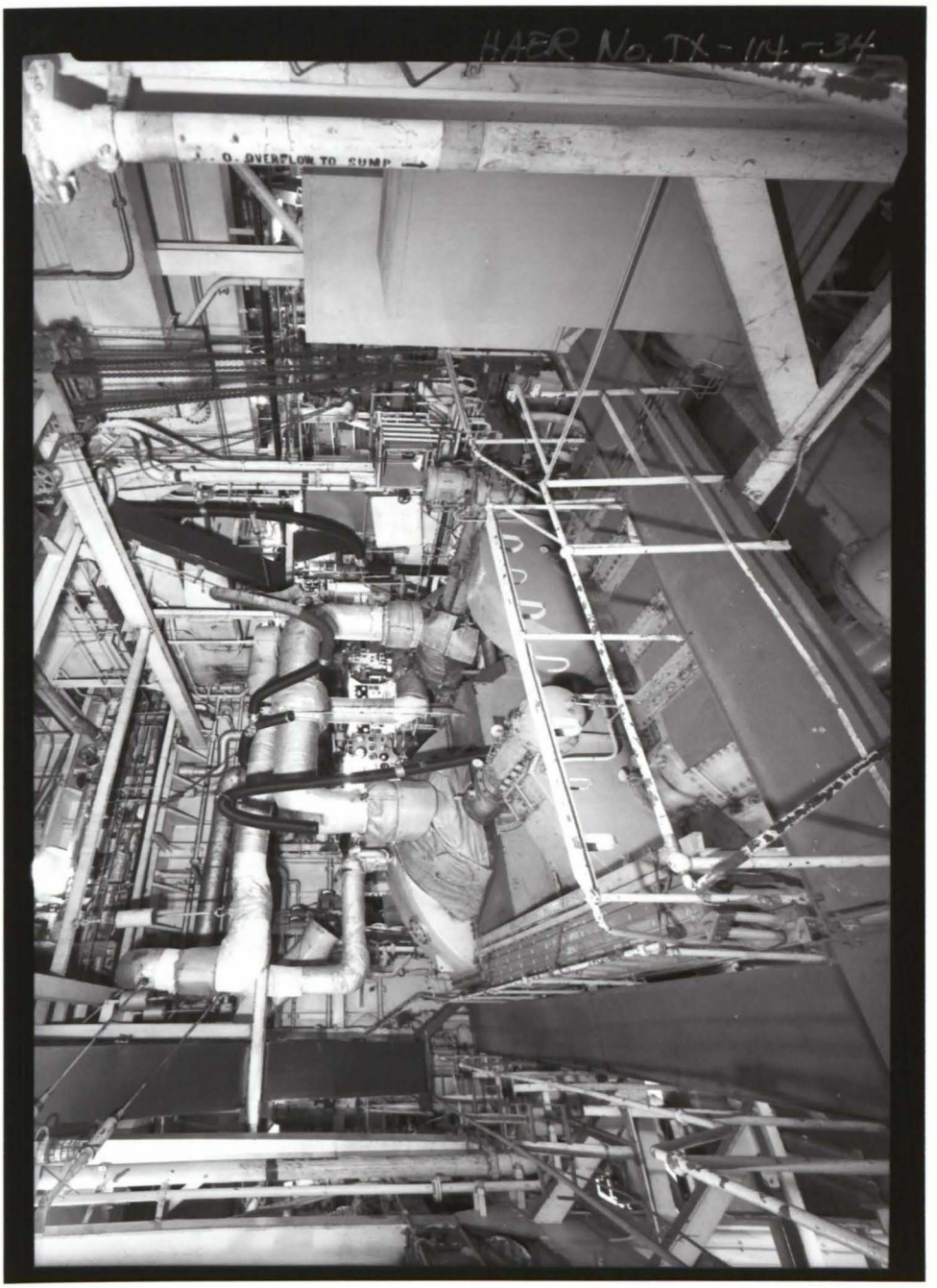

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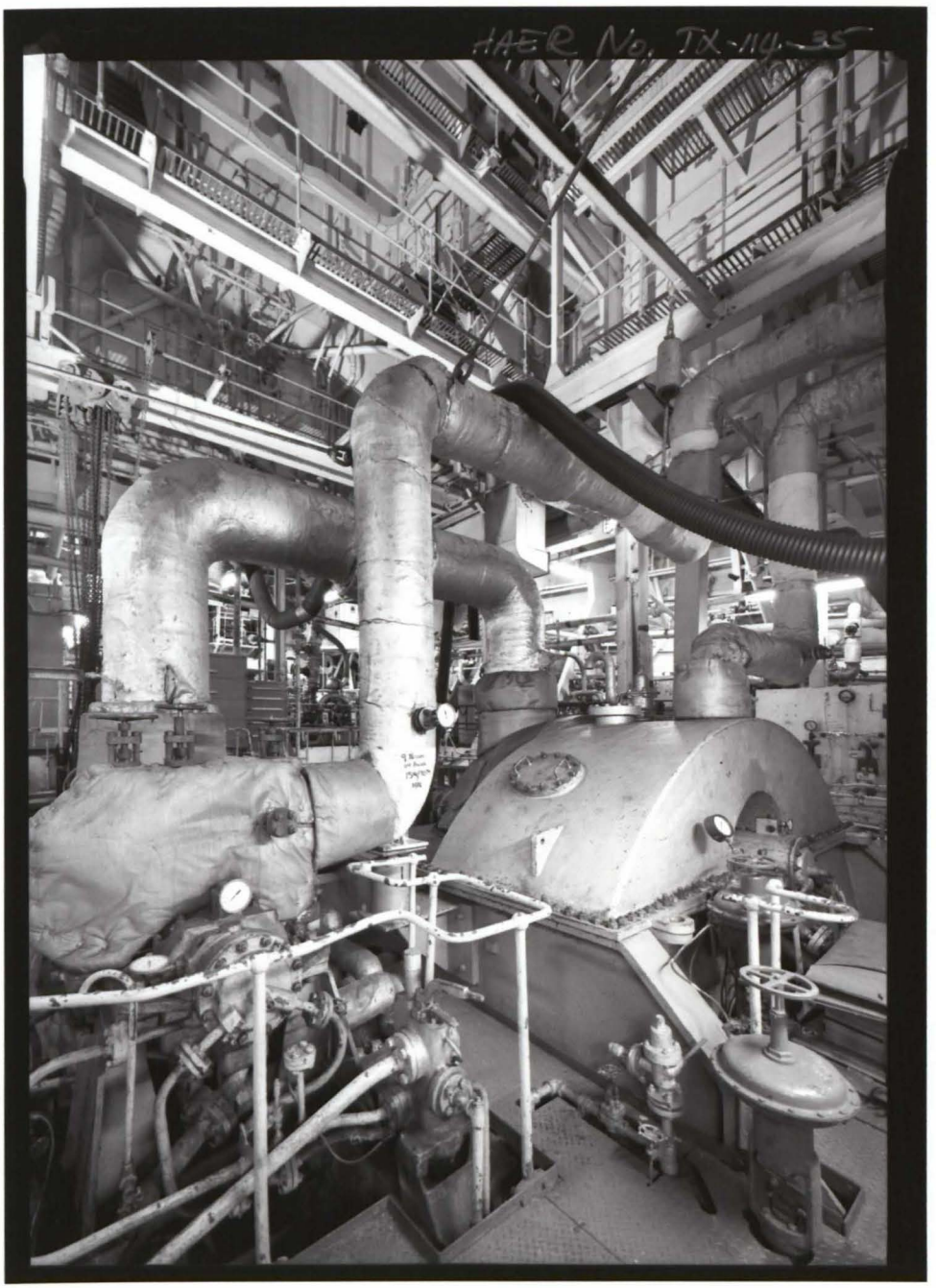

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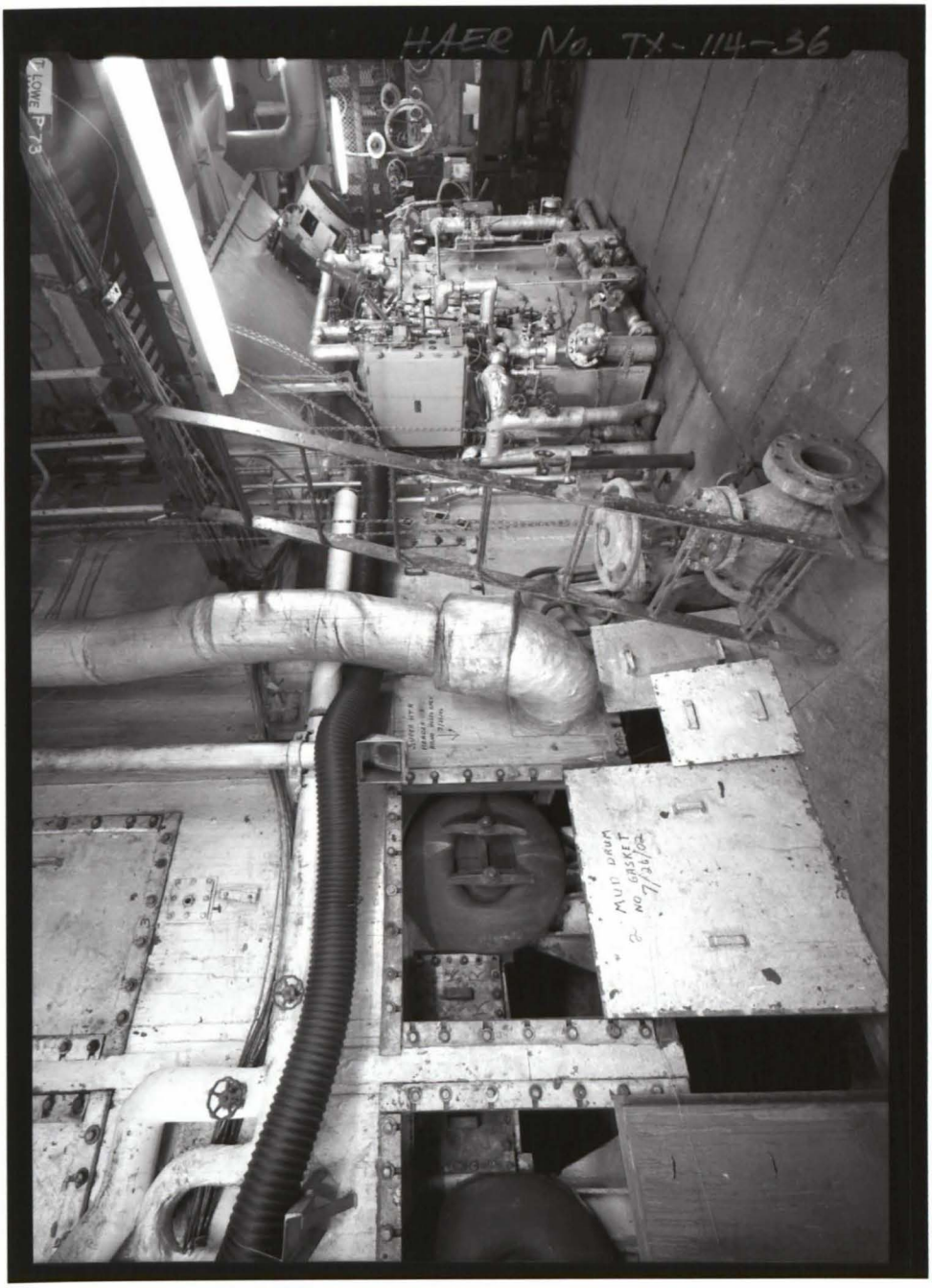

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION

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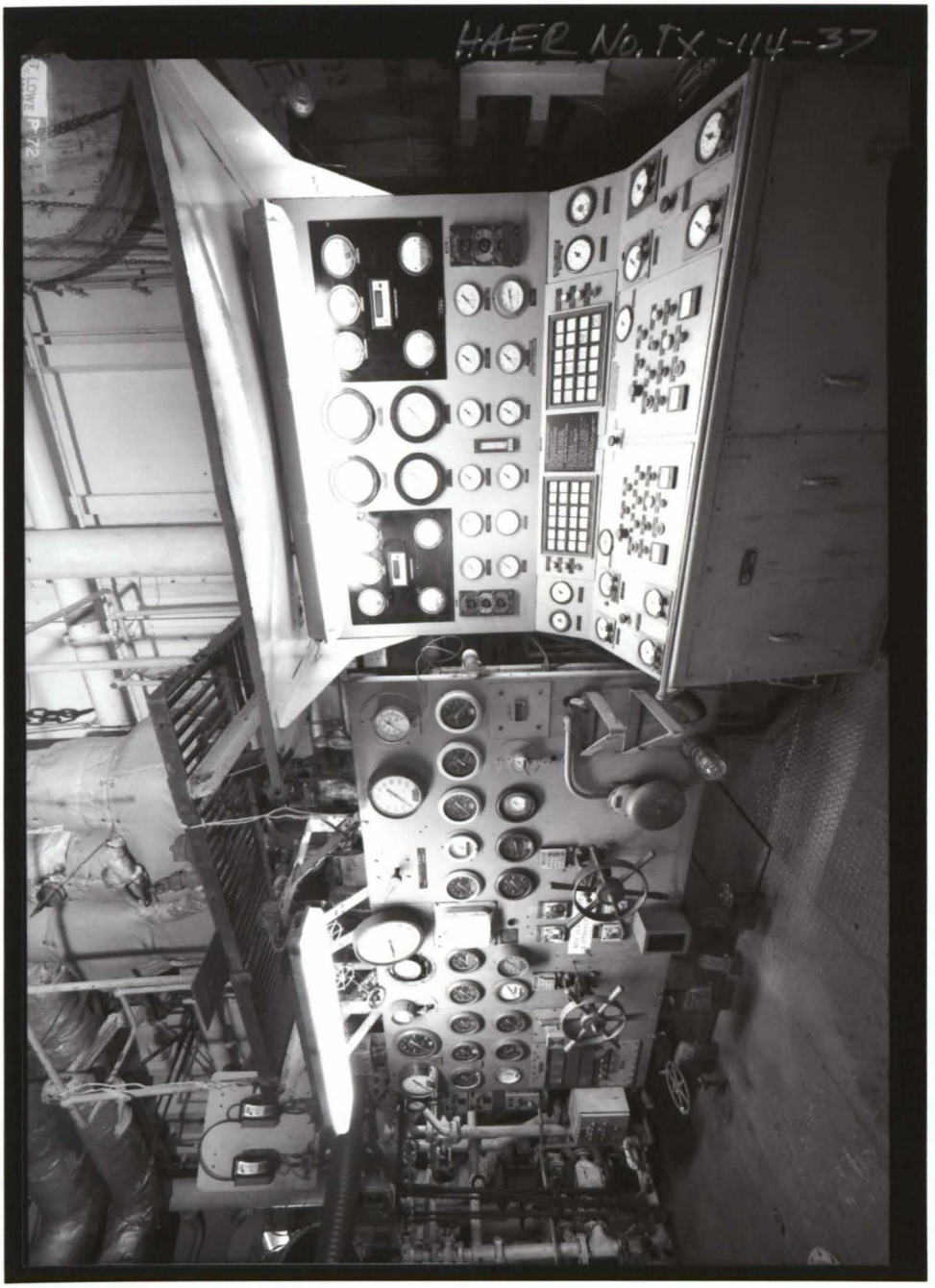


HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION

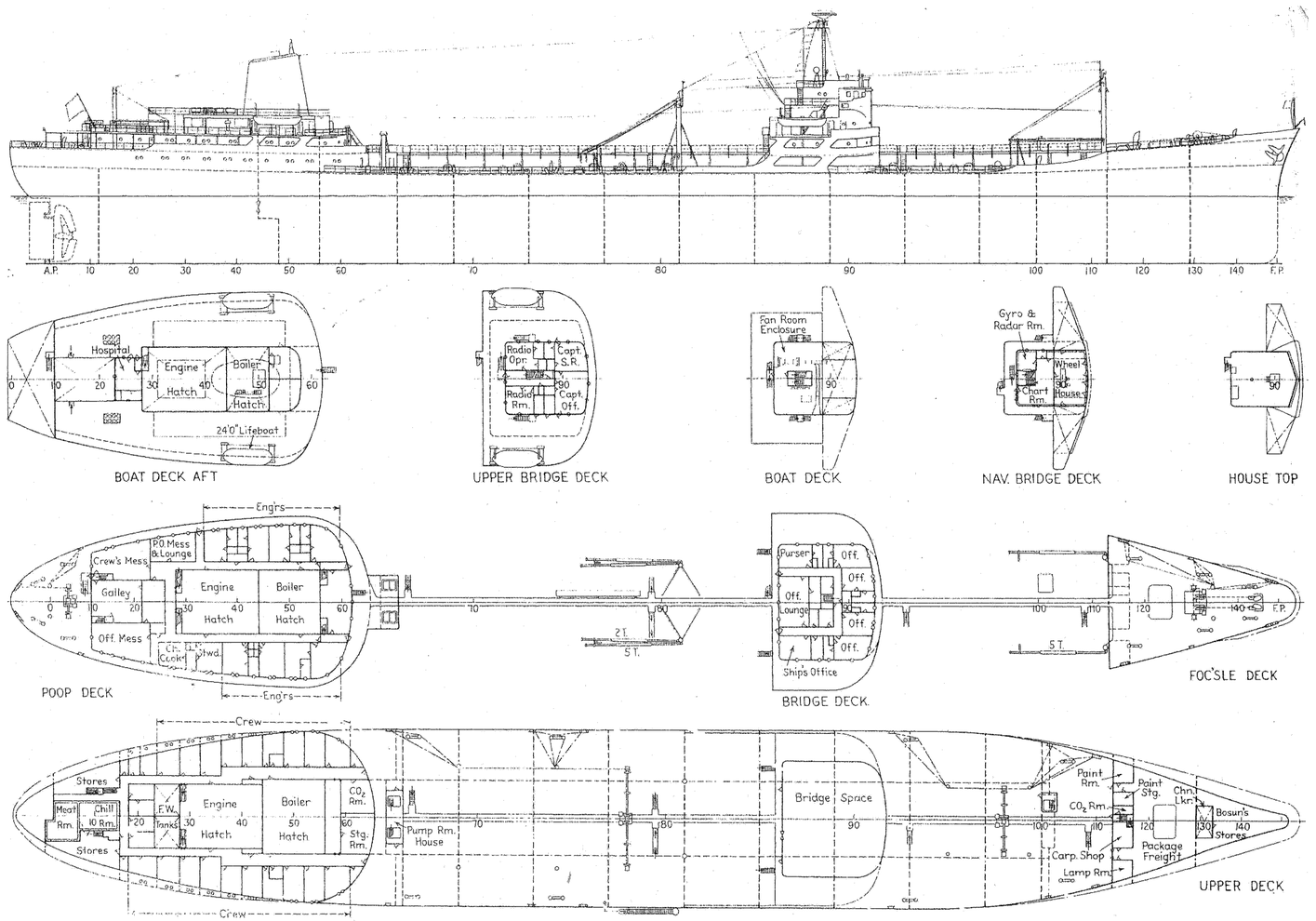
HAER No. TX-114-038-CT

HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION

HAER No. TX-114-039-CT

Original Design as USNS Potomac *(1957)*

Profile



THIS DRAWING IS A SCAN OF A DRAWING OF A SISTER SHIP, *MAUMEE*, FOUND IN *MARINE ENGINEERING/LOG,* NOV. 1959, AND REFORMATTED TO FIT THE SHEET. THE DIMENSIONS AND LAYOUTS WERE NOT VERIFIED IN THE FIELD.

LIBRARY OF CONGRESS INDEX NUMBER

HISTORIC AMERICAN ENGINEERING RECORD TX-114

SHEET 2 OF 3

TEXAS

USNS POTOMAC (SHENANDOAH)
BEAUMONT RESERVE FLEET
JEFFERSON COUNTY

BEAUMONT VICINITY

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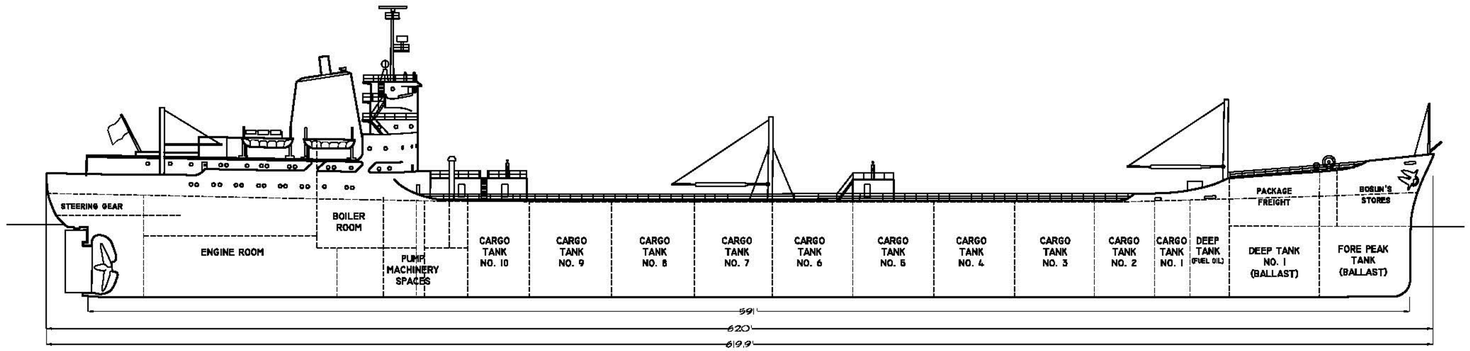
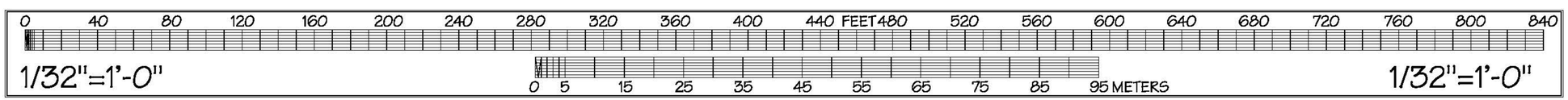
HAER MARITIME RECORDING PROGRAM
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

Reconstructed as *Shenandoah (1963)*

Profile



SISTERSHIP *CHESAPEAKE* OUTFITTED WITH THE OFFSHORE PETROLEUM DISHARGE SYSTEM (OPDS). *POTOMAC* WAS THE FIRST VESSEL FITTED WITH THIS SYSTEM. U.S. NAVY PHOTOGRAPH



THIS DRAWING WAS TRACED FROM A SCAN OF A DRAWING FOUND IN *SEALIFT MAGAZINE,* 1963, AND REFORMATTED TO FIT THE SHEET. THE DIMENSIONS AND LAYOUTS WERE NOT VERIFIED IN THE FIELD.

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HISTORIC AMERICAN BUILDINGS SURVEY
HISTORIC AMERICAN ENGINEERING RECORD
TX-114
SHEET 3 OF 3

USNS POTOMAC (SHENANDOAH)
BEAUMONT RESERVE FLEET
JEFFERSON COUNTY
TEXAS

BEAUMONT VICINITY

HAER MARITIME RECORDING PROGRAM
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR